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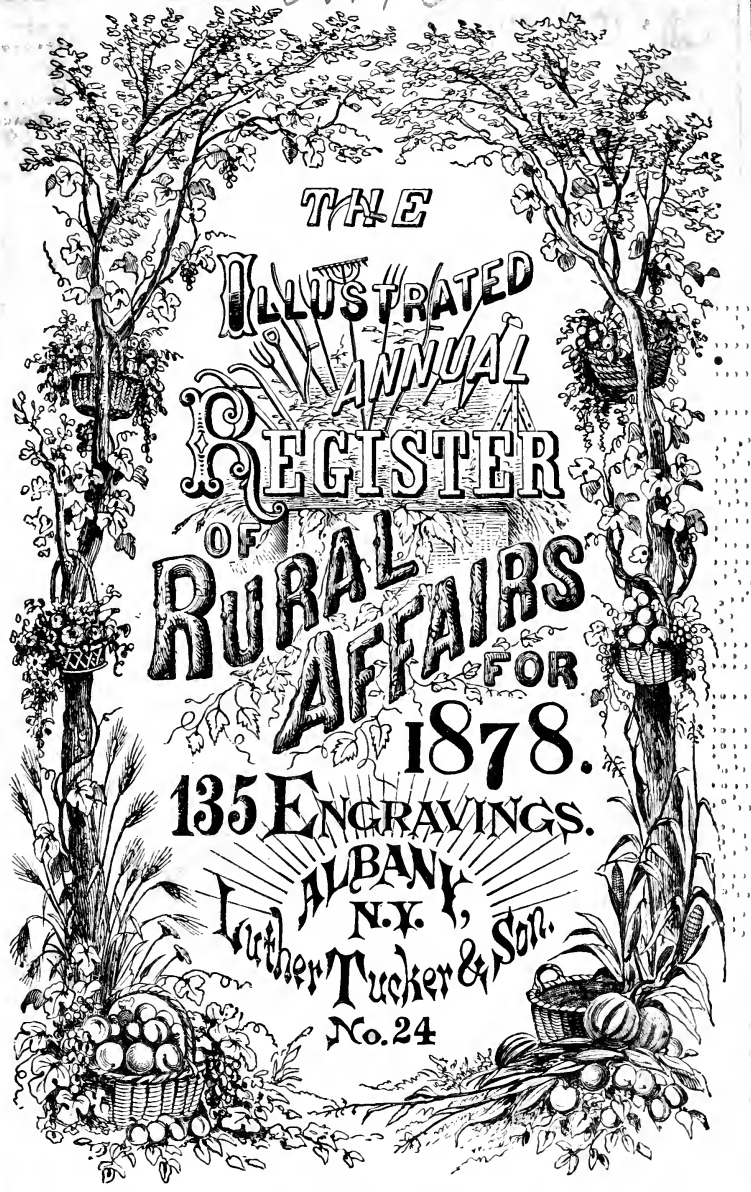

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Combined Papers, Forty-Eighth Year. | Volume for 1878. | Country Gentleman, Twenty-Sixth Year.

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THE

ILLUSTRATED ANNUAL

REGISTER OF RURAL AFFAIRS

AND

CULTIVATOR ALMANAC

FOR THE YEAR 1878,

CONTAINING

PRACTICAL SUGGESTIONS FOR THE FARMER AND HORTICULTURIST.

With nearly 140 Engravings.

BY J. J. THOMAS,

AUTHOR OF THE 'AMERICAN FRUIT CULTURIST,' AND 'FARM IMPLEMENTS;
ASSOCIATE EDITOR OF THE 'CULTIVATOR & COUNTRY GENTLEMAN.'

ALBANY, N. Y.:
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1878.

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PUBLISHERS' ADVERTISEMENT.

THE ILLUSTRATED ANNUAL REGISTER OF RURAL AFFAIRS has now reached its Twenty-Fourth year, under the continuous Editorial charge of Mr. JOHN J. THOMAS, to whose thorough practical knowledge of the various topics it has embraced, with assistance from other accomplished writers on special subjects, its readers have been indebted for the most comprehensive and concise series of papers in the different branches of Rural Economy, within the whole range of our agricultural literature. The profuse illustrations from the pencil of the Editor, by which they are accompanied, give special attractiveness and value to the work, for which most of them were especially drawn and engraved; and the reading matter is wholly from the manuscript of the authors, and original, except to the limited extent in which it is expressly stated to be a condensation from the writings of others. Brief reference is made, under the head of "Agricultual Memoranda," to the leading events of the past year—the books published, deaths recorded, chief importations of improved stock, leading public sales, &c., and the "Farmer's Register," at the end, furnishes a directory, unique of its kind, which, although not purporting to be complete, embraces all those leading establishments which are represented within a recent period in the advertising columns of the COUNTRY GENTLEMAN.

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INDEX OF No. 24, FOR 1878.

ILLUSTRATIONS.

THE

CULTIVATOR ALMANAC

FOR 1878.

ASTRONOMICAL CALCULATIONS IN EQUAL OR CLOCK TIME.

ECLIPSES FOR THE YEAR 1878.

THERE WILL BE FOUR ECLIPSES this year, and a Transit of Mercury over the Sun's Disc :

I. An Annular Eclipse of the Sun, Feb. 2, invisible in North America.

II. A Partial Eclipse of the Moon Feb. 17, partly visible in the United States. At Washington, Eclipse begins 4h. 34m. mo.; middle 6h. 2m.; ends 7h. 31m. Magnitude about 10 digits on Northern Limb.

III. A Total Eclipse of the Sun in the afternoon of July 29, visible in the United States as a partial eclipse, as follows :

PLACE.	Digits	Begins	Middle	Ends	PLACE.	Digits	Begins	Middle	Ends
		H. M.	H. M.	H. M.			H. M.	H. M.	H. M.
Santa Fé. .	11.5	2 26	3 31	4 37	New-York,...	7.9	4 47	5 40	6 33
Galveston ...	11.9	3 29	4 35	5 34	Albany.....	7.5	4 45	5 38	6 30
New-Orleans.	11.7	3 50	4 54	5 52	Cambridge, ..	7.5	4 57	5 49	6 40
Washington .	8.2	4 36	5 30	6 25	Chicago,. ..	9.3	3 42	4 41	5 41

The line along which the Total Eclipse is visible enters North America from Asia, across Behring straits, at about latitude 65°, and longitude 167° ; and passes through Alaska into British America. At 40° north latitude, and longitude 107°, which is not far from Long's Peak, nor from Denver, Col., the Eclipse is total at 3h. 28m., with a magnitude of 12 digits. In this neighborhood will occur a fine opportunity of observing the Corona. At the entrance of Sabine river, on the Gulf of Mexico, and near the border between Louisiana and Texas, the eclipse is total at 4h. 39m. From this point the line of total eclipse passes across the Gulf of Mexico, south of Florida, and over the western extremity of the Island of Cuba, affording a total eclipse at Havana, at 5h. 36m.

IV. A Partial Eclipse of the Moon, Aug. 12, partly visible in the United States. At Washington, D. C., Eclipse begins at 5h. 34m., ev.; middle 7h.; ends 8h. 26m.; magnitude 7 digits.

V. Transit of Mercury, May 6, visible in the United States, as follows :

	Washington.	New-York.	New-Orleans.
Ingress. 1st exterior contact.. ...	10h. 4m. 28s	10h. 16m. 45s.	9h. 12m. 34s.
Middle of Transit.....	1h. 51m. 38s.	2h 3m. 55s.	0h. 59m. 46s.
Egress, 2d exterior contact,.....	5h. 38m. 49s	5h. 51m. 6s.	4h. 46m. 59s.

THE FOUR SEASONS.

		D.	H.	M.		D.	H.	M.
Winter begins,	1877, December	21,	11	42 mo., and lasts		89	0	52
Spring do.	1878, March	20,	0	34 ev.,	do.	92	20	21
Summer do.	1878, June	21,	8	55 mo.,	do.	93	14	23
Autumn do.	1878, September	22,	11	18 ev.,	do.	89	18	15
Winter do.	1878, December	21,	5	33 ev. Trop. year,		365	5	51

CHURCH DAYS AND CYCLES OF TIME.

Septuagesima Sunday,	Feb. 17	Easter Sunday,...	April 21	Dominical Letter,...	F
Sexagesima do.	Feb 24	Low do. ...	April 28	Epact,...	26
Quinquagesima do.	Mar. 3	Rogation do. ...	May 26	Golden Number,....	17
Ash Wednesday,.....	Mar 6	Ascension Day,..	May 30	Solar Cycle,.	11
Quadragesima Sunday,	Mar 10	Whit Sunday, ...	June 9	Roman Indiction, ...	6
Mid-Lent.	Mar. 31	Trinity do.	June 16	Julian Period.... ...	6591
Palm Sunday,.....	Apr. 14	Corpus Christi, ..	June 20	Dionysian Period,...	207
Good Friday,.....	Apr. 19	Advent Sunday,..	Dec. 1	Jewish Lunar Cycle,.	14

MORNING AND EVENING STARS.

DEFINITION.—The conspicuous planet Venus is called a Morning Star when she rises before the Sun, and an Evening Star when she sets after the Sun. The same terms may be applied to the planet Mercury under like circumstances, though this planet is seen with difficulty, because of the strong solar twilight in which it is usually immersed. The Planets Mars, Jupiter and Saturn may be considered Morning Stars when they rise before the Sun, and Evening Stars when they set after the Sun, in the same manner as Venus does. But they may also be considered as Evening Stars when they rise before 12 o'clock at night, and as Morning Stars when they are visible before sunrise, until the day when they set on or before sunrise. The following tables have been prepared according to the first definition:

MORNING STARS.—Mercury from Jan. 10 to March 20; May 6 to July 4; Sept. 10 to Oct. 24. Venus from Feb. 20 to Dec. 5. Mars from Sept. 19 to the end of the year. Jupiter from Jan. 5 to July 26, being visible before, and setting after sunrise. Saturn from March 14 to Sept 23, being visible before, and setting after sunrise.

EVENING STARS.—Mercury from March 20 to May 6; July 4 to Sept. 10; Oct. 24 to Dec. 25. Venus until Feb. 20 and after Dec. 5. Mars from Jan. 1 to Sept. 19. Jupiter from Jan. 1 to Jan. 5; also after May 17, rising before midnight. Saturn from Jan. 1 to March 14; also from June 28 to the end of the year, rising before midnight.

APPARENT AND MEAN TIME.

Time is both *apparent* and *mean*. The Sun is on the meridian at 12 o'clock on four days only in the year. It is sometimes as much as 16¼ minutes before or after twelve when the shadow strikes the noon mark on the sun-dial. This is called *apparent time*. *Mean time* is determined by the *equation* of these irregularities for every day in the year, and is noted in all good almanacs. The latter is the true or correct time.

MOON'S PHASES.	D.	BOSTON. H. M.	NEW-YORK. H. M.	WASHINGT'N H. M.	SUN ON MERID. D.	H.	M.	S.
NEW MOON, . . .	3	9 19 mo.	9 7 mo.	8 55 mo.	1	12	3	58
FIRST QUARTER,	11	2 3 ev.	1 51 ev.	1 39 ev.	9	12	7	32
FULL MOON, . . .	18	7 27 ev.	7 15 ev.	7 3 ev.	17	12	10	29
THIRD QUARTER,	25	11 6 mo.	10 54 mo.	10 42 mo.	25	12	12	40

DAY OF MONTH.	DAY OF WEEK.	CALENDAR For Boston, New-England, New-York State, Michigan, Wisconsin, Iowa, and Oregon. SUN RISES	SUN SETS.	MOON RISES.	H. W. BOST'N	CALENDAR For New-York City, Philadelphia, Connecticut, N. Jersey, Penn., Ohio, Indiana and Illinois. SUN RISES	SUN SETS.	MOON RISES.	H. W. N. Y.	CALENDAR For Washington, Maryl'd. Virginia. Kent'ky, Miss'ri, and California. SUN RISES	SUN SETS.	MOON RISES.
		H M	H M	H M	H M	H M	H M	H M	H M	H M	H M	H M
1	T	7 30	4 38	6 4	10 14	7 25	4 44	5 58	7 0	7 19	4 49	5 50
2	W	7 30	4 39	7 5	11 9	7 25	4 44	6 58	7 55	7 19	4 50	6 51
3	T	7 30	4 40	sets.	11 57	7 25	4 45	sets.	8 43	7 19	4 51	sets.
4	F	7 30	4 41	5 38	morn.	7 25	4 46	5 44	9 24	7 19	4 51	5 50
5	S	7 30	4 42	6 43	0 38	7 25	4 47	6 48	9 58	7 19	4 52	6 53
6	F	7 30	4 43	7 46	1 12	7 25	4 48	7 50	10 35	7 19	4 53	7 53
7	M	7 30	4 44	8 48	1 49	7 25	4 49	8 50	11 11	7 19	4 54	8 53
8	T	7 29	4 45	9 49	2 25	7 24	4 50	9 50	11 46	7 19	4 55	9 50
9	W	7 29	4 46	10 50	3 0	7 24	4 51	10 49	morn.	7 19	4 56	10 49
10	T	7 29	4 47	11 51	3 37	7 24	4 52	11 50	0 23	7 19	4 57	11 50
11	F	7 29	4 48	morn.	4 18	7 24	4 53	morn.	1 4	7 19	4 58	morn.
12	S	7 28	4 49	0 55	5 0	7 23	4 54	0 52	1 48	7 18	4 59	0 49
13	F	7 28	4 50	2 2	5 56	7 23	4 55	1 57	2 42	7 18	5 0	1 54
14	M	7 28	4 52	3 12	6 58	7 23	4 56	3 7	3 44	7 18	5 1	3 1
15	T	7 27	4 53	4 24	8 0	7 22	4 57	4 17	4 46	7 17	5 2	4 11
16	W	7 27	4 54	5 34	9 7	7 22	4 59	5 26	5 53	7 17	5 3	5 19
17	T	7 26	4 55	6 38	10 13	7 21	5 0	6 28	6 59	7 17	5 4	6 22
18	F	7 25	4 56	rises.	11 15	7 21	5 1	rises.	8 1	7 16	5 6	rises.
19	S	7 25	4 58	5 49	ev. 7	7 20	5 2	5 54	8 53	7 16	5 7	5 59
20	F	7 24	4 59	7 12	0 50	7 20	5 3	7 13	9 36	7 15	5 8	7 16
21	M	7 23	5 0	8 31	1 34	7 19	5 4	8 30	10 20	7 15	5 9	8 32
22	T	7 23	5 1	9 45	2 17	7 19	5 6	9 45	11 3	7 14	5 10	9 45
23	W	7 22	5 3	11 1	3 2	7 18	5 7	10 59	11 48	7 13	5 11	10 58
24	T	7 21	5 4	morn.	3 49	7 17	5 8	morn.	ev. 35	7 13	5 12	morn.
25	F	7 20	5 5	0 17	4 41	7 16	5 9	0 14	1 27	7 12	5 13	0 11
26	S	7 20	5 6	1 32	5 43	7 15	5 10	1 27	2 29	7 11	5 15	1 23
27	F	7 19	5 8	2 46	6 49	7 15	5 12	2 41	3 35	7 11	5 16	2 35
28	M	7 18	5 9	3 57	7 55	7 14	5 13	3 50	4 41	7 10	5 17	3 43
29	T	7 17	5 10	5 0	8 58	7 13	5 14	4 52	5 44	7 9	5 18	4 44
30	W	7 16	5 11	5 53	9 57	7 12	5 15	5 46	6 43	7 8	5 19	5 38
31	T	7 15	5 13	6 36	10 50	7 11	5 17	6 29	7 36	7 7	5 20	6 22

AGRICULTURAL MEMORANDA—*Oct. 1, 1876. to Oct. 1, 1877. with reference to date of* THE COUNTRY GENTLEMAN. *containing particulars:*

Agricultural Experiment Stations Established in Scotland. July 12, 1877.
Alexander A. J., Spring Station, Ky. Sale of Horses. July 5, 1877.
American Cotswold Association Organized Jan. 25. 1877.
American Jersey Cattle Club Herd Register—4th Volume. June 28, 1877.
American Pomological Society—16th Biennial Session at Baltimore. Sept. 20, 1877.
American S. H. Herd Book—16th Volume. Buffalo: Allen & Bailey. May 3, 1877.

MOON'S PHASES.	D.	H. M.	H. M.	H. M.
NEW MOON, . . .	2	3 33 mo.	3 21 mo.	3 9 mo.
FIRST QUARTER,	10	8 33 mo.	8 21 mo.	8 9 ev.
FULL MOON, . . .	17	6 33 mo.	6 21 mo.	6 9 ev.
THIRD QUARTER,	23	10 29 ev.	10 17 ev.	10 5 ev.

BOSTON.		NEW-YORK.		WASHINGT'N	
SUN ON MERID.					
D.	H. M. S.				
1	12 13 54				
9	12 14 29				
17	12 14 14				
25	12 13 14				

CALENDAR

For Boston, New-England, New-York State, Michigan, Wisconsin, Iowa, and Oregon.

CALENDAR

For New-York City, Philadelphia, Connecticut, N. Jersey, Penn., Ohio, Indiana and Illinois.

CALENDAR

For Washington, Maryl'd, Virginia, Kent'ky, Miss'ri, and California.

DAY OF MONTH.	DAY OF WEEK.	SUN RISES	SUN SETS.	MOON RISES.	H. W. BOST'N	SUN RISES	SUN SETS.	MOON RISES.	H. W. N. Y.	SUN RISES	SUN SETS.	MOON RISES.
		H M	H M	H M	H M	H M	H M	H M	H M	H M	H M	H M
1	F	7 14	5 14	7 9	11 34	7 10	5 18	7 3	8 20	7 6	5 22	6 58
2	S	7 13	5 15	sets.	morn.	7 9	5 19	sets.	9 1	7 5	5 23	sets.
3	F	7 12	5 17	6 40	0 15	7 8	5 20	6 40	9 29	7 5	5 24	6 43
4	M	7 10	5 18	7 38	0 43	7 7	5 21	7 40	10 0	7 4	5 25	7 44
5	T	7 9	5 19	8 39	1 14	7 6	5 23	8 41	10 32	7 3	5 26	8 42
6	W	7 8	5 21	9 40	1 46	7 5	5 24	9 39	11 6	7 2	5 27	9 38
7	T	7 7	5 22	10 43	2 20	7 4	5 25	10 40	11 43	7 0	5 28	10 38
8	F	7 6	5 23	11 47	2 57	7 3	5 26	11 43	morn.	6 59	5 30	11 40
9	S	7 5	5 25	morn.	3 37	7 1	5 28	morn.	0 23	6 58	5 31	morn.
10	F	7 3	5 26	0 55	4 24	7 0	5 29	0 49	1 10	6 57	5 32	0 45
11	M	7 2	5 27	2 4	5 20	6 59	5 30	1 58	2 6	6 56	5 33	1 52
12	T	7 1	5 28	3 12	6 27	6 58	5 31	3 6	3 13	6 55	5 34	2 59
13	W	6 59	5 30	4 17	7 38	6 57	5 32	4 10	4 24	6 54	5 35	4 3
14	T	6 58	5 31	5 18	8 48	6 55	5 34	5 6	5 34	6 53	5 36	5 0
15	F	6 56	5 32	5 59	9 54	6 54	5 35	5 52	6 40	6 51	5 37	5 47
16	S	6 55	5 33	6 35	10 55	6 53	5 36	6 31	7 41	6 50	5 39	6 27
17	F	6 54	5 35	rises.	11 46	6 51	5 37	rises.	8 32	6 49	5 40	rises.
18	M	6 52	5 36	7 18	ev. 29	6 50	5 38	7 20	9 15	6 47	5 41	7 21
19	T	6 51	5 37	8 38	1 7	6 48	5 39	8 37	9 53	6 46	5 42	8 37
20	W	6 49	5 39	9 57	1 51	6 47	5 41	9 55	10 37	6 45	5 43	9 53
21	T	6 48	5 40	11 16	2 36	6 46	5 42	11 11	11 22	6 44	5 44	11 8
22	F	6 46	5 41	morn.	3 25	6 44	5 43	morn.	ev. 11	6 42	5 45	morn.
23	S	6 45	5 42	0 33	4 21	6 43	5 44	0 28	1 7	6 41	5 46	0 23
24	F	6 43	5 44	1 47	5 23	6 41	5 45	1 40	2 9	6 40	5 47	1 34
25	M	6 42	5 45	2 53	6 33	6 40	5 46	2 46	3 19	6 38	5 48	2 39
26	T	6 40	5 46	3 49	7 39	6 38	5 48	3 43	4 25	6 37	5 50	3 36
27	W	6 39	5 47	4 35	8 38	6 37	5 49	4 28	5 24	6 35	5 51	4 22
28	T	6 37	5 49	5 11	9 32	6 35	5 50	5 5	6 18	6 34	5 52	5 0

American Short-Horn Record—6th Vol. By H. Evans, Frankfort, Ky. May 24, 1877.
American Short-Horn Sales of 1876—4,004 head average $341 each. Jan. 18. 1877.
Apples Exported to England, Autumn 1876, to Spring 1877—385,207 bbls. July 26, 1877.
Australian Sale of Short-Horns and Herefords—190 head bring £20,204. May 31, 1877.
Avery. Newell. Port Huron. Mich. Obituary. March 29, 1877.
Ayrshire Record. Vol. 1—published by J. D. W. French, North Andover, Mass. Oct. 19, '76.
Bragdon, C. D., Pulaski, N. Y. Obituary. Dec. 14, 1876.
Breadstuffs—Rise in Prices at Beginning of the Russo-Turkish War. May 3; Aug 23. 1877.
Bonner, Robert, New-York. Remarkable Collection of Trotting Horses. April 5, 1877.

MOON'S PHASES.	D.	BOSTON. H. M.	NEW-YORK. H. M.	WASHINGT'N H. M.	SUN ON MERID. D.	H.	M.	S.
NEW MOON, . . .	3	10 33 ev.	10 21 ev.	10 9 ev.	1	12	12	30
FIRST QUARTER,	11	11 17 ev.	11 5 ev.	10 53 ev.	9	12	10	39
FULL MOON, . . .	18	4 23 ev.	4 11 ev.	3 59 ev.	17	12	8	26
THIRD QUARTER,	25	0 6 ev.	11 54 mo.	11 42 mo.	25	12	6	0

DAY OF MONTH.	DAY OF WEEK.	CALENDAR For Boston, New-England, New-York State, Michigan, Wisconsin, Iowa, and Oregon. SUN RISES	SUN SETS.	MOON RISES.	H. W. BOST'N	CALENDAR For New-York City, Philadelphia, Connecticut, N. Jersey, Penn., Ohio, Indiana and Illinois. SUN RISES	SUN SETS.	MOON RISES.	H. W. N. Y.	CALENDAR For Washington, Maryl'd, Virginia, Kent'ky, Miss'ri, and California. SUN RISES	SUN SETS.	MOON RISES.
		H M	H M	H M	H M	H M	H M	H M	H M	H M	H M	H M
1	F	6 35	5 50	5 39	10 21	6 34	5 51	5 35	7 7	6 32	5 53	5 30
2	S	6 34	5 51	6 3	11 3	6 32	5 52	6 0	7 49	6 31	5 54	5 56
3	**F**	6 32	5 52	sets.	11 40	6 31	5 53	sets.	8 26	6 29	5 55	sets.
4	M	6 30	5 53	6 32	morn.	6 29	5 55	6 32	8 57	6 28	5 56	6 33
5	T	6 29	5 55	7 32	0 11	6 28	5 56	7 31	9 27	6 26	5 57	7 31
6	W	6 27	5 56	8 33	0 41	6 26	5 57	8 32	9 58	6 25	5 58	8 30
7	T	6 25	5 57	9 37	1 12	6 25	5 58	9 34	10 32	6 24	5 59	9 31
8	F	6 24	5 58	10 43	1 46	6 23	5 59	10 39	11 12	6 22	5 0	10 35
9	S	6 22	5 59	11 50	2 26	6 21	6 0	11 45	11 54	6 20	6 1	11 40
10	**F**	6 20	6 1	morn.	3 8	6 20	6 1	morn.	morn.	6 19	6 2	morn.
11	M	6 19	6 2	0 57	3 59	6 18	6 2	0 52	0 45	6 17	6 3	0 45
12	T	6 17	6 3	2 3	4 58	6 16	6 3	1 56	1 44	6 16	6 4	1 40
13	W	6 15	6 4	3 0	6 8	6 15	6 5	2 53	2 54	6 15	6 5	2 47
14	T	6 14	6 5	3 48	7 21	6 13	6 6	3 41	4 7	6 13	6 6	3 37
15	F	6 12	6 6	4 29	8 27	6 11	6 7	4 24	5 13	6 11	6 7	4 19
16	S	6 10	6 7	5 2	9 30	6 10	6 8	4 58	6 16	6 10	6 8	4 55
17	**F**	6 8	6 9	5 30	10 26	6 8	6 9	5 28	7 12	6 8	6 9	5 26
18	M	6 7	6 10	rises.	11 18	6 6	6 10	rises.	8 4	6 6	6 10	rises.
19	T	6 5	6 11	7 27	ev. 2	6 5	6 11	7 25	8 48	6 5	6 11	7 22
20	W	6 3	6 12	8 48	0 42	6 3	6 12	8 45	9 28	6 3	6 12	8 43
21	T	6 1	6 13	10 8	1 26	6 1	6 13	10 5	10 12	6 2	6 13	10 1
22	F	6 0	6 14	11 28	2 14	6 0	6 14	11 23	11 0	6 0	6 14	11 17
23	S	5 58	6 15	morn.	3 6	5 58	6 15	morn.	11 52	5 59	6 15	morn.
24	**F**	5 56	6 17	0 40	4 3	5 57	6 16	0 34	ev. 49	5 57	6 16	0 27
25	M	5 54	6 18	1 43	5 6	5 55	6 17	1 36	1 52	5 55	6 17	1 29
26	T	5 53	6 19	2 33	6 10	5 53	6 18	2 26	2 56	5 54	6 18	2 19
27	W	5 51	6 20	3 12	7 13	5 52	6 19	3 6	3 59	5 52	6 19	3 0
28	T	5 49	6 21	3 43	8 7	5 50	6 20	3 38	4 53	5 51	6 20	3 33
29	F	5 47	6 22	4 8	8 55	5 48	6 21	4 4	5 41	5 49	6 21	4 1
30	S	5 46	6 23	4 29	9 40	5 47	6 22	4 26	6 26	5 48	6 22	4 24
31	**F**	5 44	6 25	4 48	10 22	5 45	6 24	4 47	7 8	5 46	6 23	4 46

MOON'S PHASES.	D.	BOSTON. H. M.	NEW-YORK. H. M.	WASHINGT'N H. M.	SUN ON MERID. D.	H.	M.	S.
NEW MOON, . . .	2	4 30 ev.	4 18 ev.	4 6 ev.	1	12	3	52
FIRST QUARTER,	10	10 11 mo.	9 59 mo.	9 47 mo.	9	12	1	33
FULL MOON, . . .	17	1 13 mo.	1 1 mo.	0 49 mo.	17	11	59	29
THIRD QUARTER,	24	3 49 mo.	3 37 mo.	3 25 mo.	25	11	57	50

DAY OF MONTH.	DAY OF WEEK.	CALENDAR For Boston, New-England, New-York State, Michigan, Wisconsin, Iowa, and Oregon. SUN RISES	SUN SETS.	MOON RISES.	H. W. BOST'N	CALENDAR For New-York City, Philadelphia, Connecticut, N. Jersey, Penn., Ohio, Indiana and Illinois. SUN RISES	SUN SETS.	MOON RISES.	H. W. N. Y.	CALENDAR For Washington, Maryl'd, Virginia, Kent'ky, Miss'ri, and California. SUN RISES	SUN SETS.	MOON RISES.
		H M	H M	H M	H M	H M	H M	H M	H M	H M	H M	H M
1	M	5 42	6 26	5 6	11 2	5 43	6 25	5 6	7 48	5 44	6 23	5 6
2	T	5 41	6 27	sets.	11 37	5 42	6 26	sets.	8 23	5 43	6 24	sets.
3	W	5 39	6 28	7 29	morn.	5 40	6 27	7 27	8 56	5 41	6 25	7 24
4	T	5 37	6 29	8 34	0 10	5 38	6 28	8 31	9 30	5 40	6 26	8 27
5	F	5 35	6 30	9 41	0 44	5 37	6 29	9 37	10 6	5 38	6 27	9 32
6	S	5 34	6 31	10 49	1 20	5 35	6 30	10 43	10 50	5 37	6 28	10 37
7	F	5 32	6 32	11 54	2 4	5 34	6 31	11 47	11 38	5 35	6 29	11 41
8	M	5 30	6 33	morn.	2 52	5 32	6 32	morn.	morn.	5 34	6 30	morn.
9	T	5 29	6 35	0 53	3 45	5 30	6 33	0 46	0 31	5 32	6 31	0 39
10	W	5 27	6 36	1 43	4 44	5 29	6 34	1 37	1 30	5 31	6 32	1 31
11	T	5 25	6 37	2 25	5 52	5 27	6 35	2 20	2 38	5 29	6 33	2 15
12	F	5 24	6 38	2 59	7 0	5 26	6 36	2 55	3 46	5 28	6 34	2 51
13	S	5 22	6 39	3 28	8 1	5 24	6 37	3 25	4 47	5 26	6 35	3 23
14	F	5 20	6 40	3 54	9 0	5 22	6 38	3 53	5 46	5 25	6 36	3 51
15	M	5 19	6 41	4 18	9 54	5 21	6 39	4 19	6 40	5 23	6 37	4 19
16	T	5 17	6 42	rises.	10 48	5 19	6 40	rises.	7 34	5 22	6 38	rises.
17	W	5 16	6 44	7 38	11 38	5 18	6 41	7 34	8 24	5 20	6 39	7 31
18	T	5 14	6 45	9 0	ev. 23	5 16	6 42	8 55	9 9	5 19	6 40	8 50
19	F	5 12	6 46	10 18	1 7	5 15	6 43	10 12	9 53	5 18	6 41	10 16
20	S	5 11	6 47	11 27	1 58	5 13	6 44	11 21	10 44	5 16	6 42	11 14
21	F	5 9	6 48	morn.	2 51	5 12	6 45	morn.	11 37	5 15	6 42	morn.
22	M	5 8	6 49	0 24	3 45	5 11	6 46	0 18	ev. 31	5 13	6 43	0 11
23	T	5 6	6 50	1 10	4 40	5 9	6 47	1 3	1 26	5 12	6 44	0 57
24	W	5 5	6 51	1 44	5 36	5 8	6 48	1 38	2 22	5 11	6 45	1 33
25	T	5 3	6 52	2 11	6 32	5 6	6 49	2 7	3 18	5 9	6 46	2 3
26	F	5 2	6 54	2 33	7 24	5 5	6 51	2 31	4 9	5 7	6 47	2 28
27	S	5 0	6 55	2 53	8 9	5 4	6 52	2 51	4 55	5 6	6 48	2 50
28	F	4 59	6 56	3 11	8 55	5 2	6 53	3 11	5 39	5 5	6 49	3 11
29	M	4 58	6 57	3 30	9 37	5 1	6 54	3 31	6 23	5 4	6 50	3 31
30	T	4 56	6 58	3 51	10 20	5 0	6 55	3 52	7 6	5 3	6 51	3 54

Connecticut Agricultural Experiment Station Organized at New-Haven. April 12, 19, 1877.
Clydesdale Horse Society Incorporated and Stud Book Established in Scotland. March 22; Aug. 23, 1877.
Dairy Show at London and its Results. Nov. 16, 1876; Oct. 25, 1877.
Dakota Wheat Farm of 10,000 acres. May 17, 1877.
Darwiniana, by Prof. Asa Gray. New-York: D Appleton & Co. Nov. 2, 1876.
Eggs and Poultry for Exportation. Oct. 11, 18, 1877.
English Short-Horn Sales of 1876—2,802 head averaging £51. March 29, 1877.
Exports for Year ending June 30, 1877, $632,805,228; Imports, $450,845,376. Sept. 13, '77.

MOON'S PHASES.	D.	BOSTON. H. M.	NEW-YORK. H. M.	WASHINGT'N H. M.	SUN ON MERID. D.	H. M. S.
NEW MOON, . . .	2	8 6 mo,	7 54 mo.	7 42 mo.	1	11 56 57
FIRST QUARTER,	9	5 48 ev.	5 36 ev.	5 24 ev.	9	11 56 16
FULL MOON, . . .	16	9 47 mo.	9 35 mo.	9 23 mo.	17	11 56 11
THIRD QUARTER,	23	8 58 ev.	8 46 ev.	8 34 ev.	25	11 56 41
NEW MOON, . . .	31	9 4 ev.	8 52 ev.	8 40 ev.	31	11 57 26

CALENDAR

For Boston, New-England, New-York State, Michigan, Wisconsin, Iowa, and Oregon.

DAY OF MONTH.	DAY OF WEEK.	SUN RISES	SUN SETS.	MOON RISES.	H. W. BOST'N
		H M	H M	H M	H M
1	W	4 55	6 59	4 4	11 2
2	T	4 53	7 0	sets.	11 45
3	F	4 52	7 1	8 45	morn.
4	S	4 51	7 3	9 49	0 23
5	F	4 49	7 4	10 47	1 4
6	M	4 48	7 5	11 36	1 53
7	T	4 47	7 6	morn.	2 42
8	W	4 46	7 7	0 17	3 34
9	T	4 45	7 8	0 50	4 29
10	F	4 43	7 9	1 19	5 30
11	S	4 42	7 10	1 45	6 32
12	F	4 41	7 11	2 9	7 33
13	M	4 40	7 12	2 33	8 27
14	T	4 39	7 13	2 59	9 24
15	W	4 38	7 14	3 29	10 22
16	T	4 37	7 15	rises.	11 18
17	F	4 36	7 16	9 8	ev. 7
18	S	4 35	7 17	10 8	0 54
19	F	4 34	7 18	10 55	1 42
20	M	4 33	7 19	11 33	2 31
21	T	4 33	7 20	morn.	3 19
22	W	4 32	7 21	0 2	4 5
23	T	4 31	7 22	0 27	4 52
24	F	4 30	7 23	0 49	5 42
25	S	4 29	7 24	1 7	6 28
26	F	4 28	7 25	1 26	7 17
27	M	4 28	7 26	1 45	8 4
28	T	4 27	7 27	2 6	8 52
29	W	4 27	7 27	2 30	9 42
30	T	4 26	7 28	3 0	10 33
31	F	4 26	7 29	sets.	11 23

CALENDAR

For New-York City, Philadelphia, Connecticut, N. Jersey, Penn., Ohio, Indiana and Illinois.

SUN RISES	SUN SETS.	MOON RISES.	H. W. N. Y.
H M	H M	H M	H M
4 58	6 56	4 6	7 48
4 57	6 57	sets.	8 31
4 56	6 58	8 39	9 9
4 54	6 59	9 42	9 50
4 53	7 0	10 40	10 39
4 52	7 1	11 30	11 28
4 51	7 2	morn.	morn.
4 50	7 3	0 12	0 20
4 49	7 4	0 47	1 15
4 48	7 5	1 17	2 16
4 47	7 6	1 44	3 18
4 46	7 7	2 10	4 19
4 44	7 8	2 34	5 13
4 43	7 9	3 2	6 10
4 42	7 10	3 34	7 8
4 42	7 11	rises.	8 4
4 41	7 12	9 2	8 53
4 40	7 13	10 1	9 40
4 39	7 14	10 49	10 28
4 38	7 15	11 28	11 17
4 37	7 16	11 58	ev. 5
4 37	7 16	morn.	0 51
4 36	7 17	0 24	1 38
4 35	7 18	0 46	2 28
4 34	7 19	1 7	3 14
4 34	7 20	1 27	4 3
4 33	7 21	1 47	4 50
4 33	7 21	2 9	5 38
4 32	7 22	2 35	6 28
4 32	7 23	3 5	7 19
4 31	7 24	sets.	8 9

CALENDAR

For Washington, Maryl'd, Virginia, Kent'ky, Miss'ri, and California.

SUN RISES	SUN SETS.	MOON RISES.
H M	H M	H M
5 2	6 52	4 10
5 1	6 53	sets.
4 59	6 54	8 34
4 58	6 55	9 36
4 57	6 56	10 34
4 56	6 57	11 24
4 55	6 58	morn.
4 54	6 59	0 7
4 53	7 0	0 43
4 52	7 1	1 14
4 51	7 2	1 43
4 50	7 3	2 10
4 49	7 3	2 36
4 48	7 4	3 5
4 47	7 5	3 39
4 46	7 6	rises.
4 45	7 7	8 55
4 44	7 8	9 55
4 44	7 9	10 43
4 43	7 10	11 23
4 42	7 11	11 55
4 42	7 11	morn.
4 41	7 12	0 21
4 40	7 13	0 45
4 40	7 14	1 6
4 39	7 15	1 27
4 38	7 15	1 49
4 38	7 16	2 13
4 37	7 17	2 39
4 37	7 18	3 11
4 37	7 18	sets.

Exports of Bacon, Pork, Lard, &c., 1876, to amount of $68 000,000—Cattle Products, $34 600,000. April 5. 1877.

Farm Yard Club of Jotham. By Dr. G. B Loring. Boston: Lockwood, Brooks & Co. Dec. 14. 1876.

Fresh Meat and Live Stock Exports, Jan. 1 to Oct. 1, 1877, $10 963.866. Oct. 18, 1877.

Grapes Successfully brought by Rail from California. Nov. 2, 1876.

Gridley, Rev A. D., Clinton, N. Y. Obituary. Nov. 2. 1876.

MOON'S PHASES.	D.	BOSTON. H. M.	NEW-YORK. H. M.	WASHINGT'N H. M.	SUN ON MERID. D.	H.	M.	S.
FIRST QUARTER,	7	11 11 ev.	10 59 ev.	10 47 ev.	1	11	57	35
FULL MOON, . . .	14	7 7 ev.	6 55 ev.	6 43 ev.	9	11	58	59
THIRD QUARTER,	22	2 31 ev.	2 19 ev.	2 7 ev.	17	12	0	38
NEW MOON, . . .	30	7 47 mo.	7 35 mo.	7 23 mo.	25	12	2	21

DAY OF MONTH.	DAY OF WEEK.	CALENDAR For Boston, New-England, New-York State, Michigan, Wisconsin, Iowa, and Oregon. SUN RISES	SUN SETS.	MOON RISES.	H. W. BOST'N	CALENDAR For New-York City, Philadelphia, Connecticut, N. Jersey, Penn., Ohio, Indiana and Illinois. SUN RISES	SUN SETS.	MOON RISES.	H. W. N. Y.	CALENDAR For Washington, Maryl'd, Virginia, Kent'ky, Miss'ri, and California. SUN RISES	SUN SETS.	MOON RISES.
		H M	H M	H M	H M	H M	H M	H M	H M	H M	H M	H M
1	S	4 25	7 30	8 40	morn.	4 31	7 25	8 33	8 56	4 36	7 19	8 27
2	F	4 25	7 31	9 32	0 10	4 30	7 25	9 26	9 40	4 36	7 20	9 20
3	M	4 24	7 31	10 17	0 54	4 30	7 26	10 12	10 27	4 35	7 20	10 6
4	T	4 24	7 32	10 52	1 41	4 30	7 27	10 48	11 16	4 35	7 21	10 44
5	W	4 24	7 33	11 23	2 30	4 29	7 27	11 20	morn.	4 35	7 22	11 17
6	T	4 23	7 34	11 49	3 19	4 29	7 28	11 47	0 5	4 35	7 22	11 46
7	F	4 23	7 34	morn.	4 8	4 29	7 29	morn.	0 54	4 34	7 23	morn.
8	S	4 23	7 35	0 13	5 1	4 28	7 29	0 13	1 47	4 34	7 23	0 13
9	F	4 23	7 35	0 36	5 59	4 28	7 30	0 37	2 45	4 34	7 24	0 38
10	M	4 23	7 36	1 0	7 0	4 28	7 30	1 3	3 46	4 34	7 25	1 6
11	T	4 22	7 37	1 28	8 0	4 28	7 31	1 32	4 46	4 34	7 25	1 36
12	W	4 22	7 37	2 1	9 1	4 28	7 31	2 6	5 47	4 34	7 25	2 12
13	T	4 22	7 38	2 41	10 3	4 28	7 31	2 48	6 49	4 34	7 26	2 55
14	F	4 22	7 38	rises.	11 3	4 28	7 32	rises.	7 49	4 34	7 26	rises.
15	S	4 22	7 38	8 47	11 55	4 28	7 33	8 41	8 41	4 34	7 27	8 34
16	F	4 22	7 39	9 29	ev. 40	4 28	7 33	9 24	9 26	4 34	7 27	9 18
17	M	4 22	7 39	10 2	1 22	4 28	7 33	9 58	10 8	4 34	7 27	9 53
18	T	4 22	7 39	10 29	2 5	4 28	7 34	10 25	10 51	4 34	7 28	10 22
19	W	4 23	7 40	10 51	2 46	4 28	7 34	10 49	11 32	4 34	7 28	10 46
20	T	4 23	7 40	11 11	3 25	4 28	7 34	11 10	ev. 11	4 34	7 28	11 9
21	F	4 23	7 40	11 29	4 5	4 29	7 35	11 30	0 51	4 35	7 29	11 30
22	S	4 23	7 40	11 48	4 47	4 29	7 35	11 50	1 33	4 35	7 29	11 51
23	F	4 23	7 41	morn.	5 34	4 29	7 35	morn.	2 20	4 35	7 29	morn.
24	M	4 23	7 41	0 8	6 23	4 29	7 35	0 10	3 9	4 35	7 29	0 13
25	T	4 24	7 41	0 30	7 18	4 30	7 35	0 33	4 4	4 36	7 29	0 38
26	W	4 24	7 41	0 57	8 13	4 30	7 35	1 2	4 59	4 36	7 29	1 7
27	T	4 24	7 41	1 30	9 10	4 31	7 35	1 36	5 56	4 36	7 29	1 43
28	F	4 25	7 41	2 12	10 9	4 31	7 35	2 19	6 55	4 37	7 29	2 26
29	S	4 25	7 41	3 5	11 7	4 31	7 35	3 13	7 53	4 37	7 29	3 20
30	F	4 26	7 41	sets.	11 58	4 32	7 35	sets.	8 44	4 38	7 29	sets.

Guernsey Cattle Breeders' Association Organized at New-York Feb. 15. 1877.
Guernseys Imported by E. F. Bowditch, Framingham, Mass, May 10; by M. C Weld, Oct. 18. 1877.
Guernsey Scale of Points newly Established on the Island. Nov. 9. 1876.
Hand Book of Grape Culture. by T. H. Hyatt, San Francisco: Bancroft & Co. Oct. 26, '76
Hand Book Landscape Gardening, by F. R. Elliott Rochester: D. M. Dewey. Feb. 1, '77.
Harold, John, Hempstead, N. Y. Obituary. Nov 9. 1876.
Harris. S. D., Hudson, O,. formerly Editor Ohio Cultivator. Obituary. May 3, 1877.
Hope, George, late of Fenton Barns, Scotland. Obituary. Dec. 28, 1876.

MOON'S PHASES.	D.	BOSTON. H. M.	NEW-YORK. H. M.	WASHINGT'N H. M.	SUN ON MERID. D.	H.	M.	S.
FIRST QUARTER,	7	3 36 mo.	3 24 mo.	3 12 mo.	1	12	3	35
FULL MOON, . . .	14	6 11 mo.	5 59 mo.	5 47 mo.	9	12	4	57
THIRD QUARTER,	22	7 32 mo.	7 20 mo.	7 8 mo.	17	12	5	53
NEW MOON, . . .	29	4 56 ev.	4 44 ev.	4 32 ev.	25	12	6	15

CALENDAR

For Boston, New-England, New-York State, Michigan, Wisconsin, Iowa, and Oregon.

DAY OF MONTH.	DAY OF WEEK.	SUN RISES	SUN SETS.	MOON SETS.	H. W. BOST'N
		H M	H M	H M	H M
1	M	4 27	7 41	8 52	morn.
2	T	4 27	7 41	9 24	0 42
3	W	4 28	7 40	9 52	1 27
4	T	4 28	7 40	10 17	2 12
5	F	4 29	7 40	10 40	2 57
6	S	4 30	7 40	11 4	3 43
7	F	4 30	7 39	11 31	4 32
8	M	4 31	7 39	morn.	5 31
9	T	4 32	7 38	0 1	6 34
10	W	4 32	7 38	0 38	7 41
11	T	4 33	7 37	1 23	8 47
12	F	4 34	7 37	2 18	9 50
13	S	4 35	7 36	3 20	10 50
14	F	4 35	7 36	rises.	11 41
15	M	4 36	7 35	8 30	ev. 23
16	T	4 37	7 35	8 54	0 58
17	W	4 38	7 34	9 15	1 34
18	T	4 39	7 33	9 33	2 9
19	F	4 40	7 32	9 52	2 45
20	S	4 41	7 32	10 11	3 21
21	F	4 42	7 31	10 32	4 0
22	M	4 43	7 30	10 56	4 45
23	T	4 43	7 29	11 26	5 38
24	W	4 44	7 28	morn.	6 38
25	T	4 45	7 27	0 3	7 42
26	F	4 46	7 26	0 50	8 45
27	S	4 47	7 25	1 50	9 49
28	F	4 48	7 24	2 59	10 50
29	M	4 49	7 23	sets.	11 43
30	T	4 50	7 22	7 53	morn.
31	W	4 51	7 21	8 20	0 26

CALENDAR

For New-York City, Philadelphia, Connecticut, N. Jersey, Penn., Ohio, Indiana and Illinois.

SUN RISES	SUN SETS.	MOON SETS.	H. W. N. Y.
H M	H M	H M	H M
4 32	7 35	8 48	9 28
4 33	7 35	9 21	10 13
4 33	7 35	9 50	10 58
4 34	7 34	10 17	11 43
4 35	7 34	10 41	morn.
4 35	7 34	11 7	0 29
4 36	7 34	11 36	1 18
4 36	7 33	morn.	2 17
4 37	7 33	0 6	3 20
4 38	7 33	0 44	4 27
4 38	7 32	1 30	5 33
4 39	7 32	2 25	6 36
4 40	7 31	3 27	7 36
4 41	7 31	rises.	8 27
4 41	7 30	8 26	9 9
4 42	7 29	8 51	9 44
4 43	7 29	9 13	10 20
4 44	7 28	9 33	10 55
4 45	7 27	9 53	11 31
4 46	7 27	10 13	ev. 7
4 46	7 26	10 35	0 46
4 47	7 25	11 1	1 31
4 48	7 24	11 32	2 24
4 49	7 24	morn.	3 24
4 50	7 23	0 10	4 28
4 51	7 22	0 58	5 31
4 52	7 21	1 57	6 35
4 53	7 20	3 6	7 36
4 54	7 19	sets.	8 29
4 55	7 18	7 51	9 12
4 56	7 17	8 19	9 52

CALENDAR

For Washington, Maryl'd, Virginia, Kent'ky, Miss'ri, and California.

SUN RISES	SUN SETS.	MOON SETS.
H M	H M	H M
4 38	7 29	8 43
4 39	7 29	9 18
4 39	7 29	9 49
4 40	7 29	10 16
4 40	7 28	10 42
4 41	7 28	11 9
4 41	7 28	11 38
4 42	7 28	morn.
4 43	7 27	0 12
4 43	7 27	0 51
4 44	7 27	1 38
4 45	7 26	2 33
4 45	7 26	3 34
4 46	7 25	rises.
4 47	7 25	8 23
4 48	7 24	8 49
4 48	7 24	9 12
4 49	7 23	9 33
4 50	7 22	9 55
4 51	7 22	10 16
4 51	7 21	10 40
4 52	7 20	11 6
4 53	7 19	11 37
4 54	7 19	morn.
4 55	7 18	0 17
4 56	7 17	1 6
4 56	7 16	2 5
4 57	7 15	3 14
4 58	7 14	sets.
4 59	7 13	7 48
5 0	7 12	8 17

Hoskyns, C. W., author of "Talpa" and other works on English Agriculture. Obituary. Dec. 28, 1876.

India a large Producer of Wheat for the English Market. July 5, 1877.

Iowa State Agricultural Report. Nov. 30. 1876.

Irrigation for Farm, Garden and Orchard. By H. Stewart. New-York: O. Judd Co. April 19. 1877.

Jerseys imported by J. A. & I. T. Burden, Troy, July 5; by E. J. Arnold, Aug. 16; by M. C. Weld, Oct. 18, 1877.

MOON'S PHASES.	D.	BOSTON. H. M.	NEW-YORK. H. M.	WASHINGT'N H. M.	SUN ON MERID. D.	H.	M.	S.
FIRST QUARTER,	5	8 35 mo.	8 23 mo.	8 11 mo.	1	12	6	5
FULL MOON, . . .	12	7 32 ev.	7 20 ev.	7 8 ev.	9	12	5	16
THIRD QUARTER,	20	11 24 ev.	11 12 ev.	11 0 ev.	17	12	3	50
NEW MOON, . . .	28	1 15 mo.	1 3 mo.	0 51 mo.	25	12	1	53

CALENDAR

For Boston, New-England, New-York State, Michigan, Wisconsin, Iowa, and Oregon.

CALENDAR

For New-York City, Philadelphia, Connecticut, N. Jersey, Penn., Ohio, Indiana and Illinois.

CALENDAR

For Washington, Maryl'd, Virginia, Kent'ky, Miss'ri, and California.

DAY OF MONTH.	DAY OF WEEK.	SUN RISES	SUN SETS.	MOON SETS.	H. W. BOST'N	SUN RISES	SUN SETS.	MOON SETS.	H. W. N. Y.	SUN RISES	SUN SETS.	MOON SETS.
		H M	H M	H M	H M	H M	H M	H M	H M	H M	H M	H M
1	T	4 52	7 20	8 44	1 6	4 56	7 16	8 45	10 34	5 1	7 11	8 45
2	F	4 53	7 19	9 8	1 48	4 57	7 15	9 10	11 18	5 2	7 10	9 12
3	S	4 54	7 18	9 34	2 32	4 58	7 14	9 38	morn.	5 3	7 9	9 41
4	F	4 55	7 16	10 4	3 19	4 59	7 12	10 8	0 5	5 4	7 8	10 13
5	M	4 57	7 15	10 38	4 10	5 0	7 11	10 44	0 56	5 4	7 7	10 51
6	T	4 58	7 14	11 21	5 9	5 1	7 10	11 28	1 55	5 5	7 6	11 35
7	W	4 59	7 13	morn.	6 19	5 2	7 9	morn.	3 5	5 6	7 5	morn.
8	T	5 0	7 11	0 11	7 29	5 3	7 8	0 19	4 15	5 7	7 4	0 27
9	F	5 1	7 10	1 12	8 35	5 4	7 6	1 19	5 21	5 8	7 3	1 26
10	S	5 2	7 9	2 16	9 36	5 5	7 5	2 23	6 22	5 9	7 1	2 30
11	F	5 3	7 7	3 24	10 31	5 6	7 4	3 30	7 17	5 10	7 0	3 35
12	M	5 4	7 6	rises.	11 18	5 7	7 2	rises.	8 4	5 11	6 59	rises.
13	T	5 5	7 4	7 19	11 56	5 8	7 1	7 15	8 43	5 12	6 58	7 15
14	W	5 6	7 3	7 38	ev. 30	5 9	7 0	7 38	9 15	5 13	6 56	7 38
15	T	5 7	7 2	7 57	1 0	5 10	6 58	7 58	9 46	5 14	6 55	7 59
16	F	5 8	7 0	8 16	1 31	5 11	6 57	8 18	10 17	5 14	6 54	8 20
17	S	5 9	6 59	8 37	2 6	5 12	6 56	8 40	10 52	5 15	6 52	8 43
18	F	5 10	6 57	9 0	2 42	5 13	6 54	9 4	11 28	5 16	6 51	9 8
19	M	5 11	6 56	9 27	3 22	5 14	6 53	9 32	ev. 8	5 17	6 50	9 38
20	T	5 12	6 54	10 0	4 8	5 15	6 52	10 7	0 54	5 18	6 49	10 13
21	W	5 13	6 52	10 45	5 2	5 16	6 50	10 52	1 49	5 19	6 47	10 56
22	T	5 15	6 51	11 34	6 6	5 17	6 48	11 41	2 52	5 20	6 46	11 48
23	F	5 16	6 49	morn.	7 17	5 18	6 47	morn.	4 3	5 21	6 44	morn.
24	S	5 17	6 48	0 37	8 23	5 19	6 45	0 44	5 9	5 22	6 43	0 51
25	F	5 18	6 46	1 50	9 27	5 20	6 44	1 55	6 13	5 23	6 41	2 1
26	M	5 19	6 45	3 6	10 27	5 21	6 42	3 10	7 13	5 23	6 40	3 15
27	T	5 20	6 43	sets.	11 20	5 22	6 41	sets.	8 6	5 24	6 38	sets.
28	W	5 21	6 41	6 45	morn.	5 23	6 39	6 45	8 49	5 25	6 37	6 44
29	T	5 22	6 40	7 10	0 3	5 24	6 38	7 11	9 29	5 26	6 35	7 13
30	F	5 23	6 38	7 36	0 43	5 25	6 36	7 39	10 10	5 27	6 34	7 42
31	S	5 24	6 36	8 5	1 24	5 26	6 34	8 9	10 57	5 28	6 32	8 13

Japanese Purchases of Live Stock in Ohio and Kentucky. May 3, 1877.

Lawes, J. B. Promised Endowment of Rothamsted Experiment Station with £100,000. Oct 25, 1877.

Le Duc. W. G., of Minnesota, appointed U. S. Commissioner of Agriculture. July 5, 1877.

Lightning Protection. By H. W. Spang. Philadelphia: Claxton, Remsen & Haffelfinger. June 21, 1877.

McMillan, D., Xenia, O. Obituary. Nov 23, 1876.

Michigan Pomological Society—5th Annual Report Oct. 26, 1876.

MOON'S PHASES.	D.	BOSTON. H. M.	NEW-YORK. H. M.	WASHINGT'N H. M.	SUN ON MERID. D.	H.	M.	S.
FIRST QUARTER,	3	3 42 ev.	3 30 ev.	3 18 ev.	1	11	59	49
FULL MOON, . . .	11	11 5 mo.	10 53 mo.	10 41 mo.	9	11	57	10
THIRD QUARTER,	19	1 46 ev.	1 34 ev.	1 22 ev.	17	11	55	22
NEW MOON, . . .	26	9 26 mo.	9 14 mo.	9 2 mo.	25	11	51	35

CALENDAR

For Boston, New-England, New-York State, Michigan, Wisconsin, Iowa, and Oregon.

DAY OF MONTH.	DAY OF WEEK.	SUN RISES. H	M	SUN SETS. H	M	MOON SETS. H	M	H. W. BOST'N H	M
1	F	5	25	6	35	8	38	2	10
2	M	5	26	6	33	9	19	2	59
3	T	5	27	6	31	10	8	3	55
4	W	5	28	6	30	11	5	4	57
5	T	5	29	6	28	morn.		6	6
6	F	5	30	6	26	0	9	7	16
7	S	5	31	6	24	1	15	8	17
8	F	5	33	6	23	2	22	9	12
9	M	5	34	6	21	3	27	10	2
10	T	5	35	6	19	4	30	10	44
11	W	5	36	6	17	rises.		11	23
12	T	5	37	6	16	6	22	11	56
13	F	5	38	6	14	6	42	ev.	28
14	S	5	39	6	12	7	3	0	58
15	F	5	40	6	10	7	29	1	33
16	M	5	41	6	8	8	0	2	11
17	T	5	42	6	7	8	37	2	54
18	W	5	43	6	5	9	24	3	43
19	T	5	44	6	3	10	22	4	39
20	F	5	45	6	1	11	27	5	44
21	S	5	46	6	0	morn.		6	54
22	F	5	47	5	58	0	40	7	58
23	M	5	49	5	56	1	56	8	59
24	T	5	50	5	54	3	14	9	57
25	W	5	51	5	53	4	33	10	50
26	T	5	52	5	51	sets.		11	38
27	F	5	53	5	49	6	3	morn.	
28	S	5	54	5	47	6	35	0	22
29	F	5	55	5	45	7	14	1	12
30	M	5	56	5	44	8	1	1	54

CALENDAR

For New-York City, Philadelphia, Connecticut, N. Jersey, Penn., Ohio, Indiana and Illinois.

SUN RISES. H	M	SUN SETS. H	M	MOON SETS. H	M	H. W. N. Y. H	M
5	27	6	33	8	44	11	45
5	28	6	31	9	26	morn.	
5	29	6	30	10	15	0	41
5	30	6	28	11	13	1	43
5	31	6	26	morn.		2	52
5	32	6	25	0	16	4	2
5	33	6	23	1	21	5	3
5	34	6	21	2	27	5	58
5	35	6	20	3	31	6	48
5	36	6	18	4	32	7	30
5	37	6	16	rises.		8	9
5	38	6	15	6	24	8	42
5	39	6	13	6	45	9	14
5	40	6	11	7	7	9	44
5	41	6	10	7	34	10	19
5	42	6	8	8	6	10	57
5	43	6	6	8	44	11	40
5	44	6	4	9	32	ev.	29
5	45	6	3	10	29	1	25
5	46	6	1	11	34	2	30
5	47	5	59	morn.		3	40
5	48	5	58	0	45	4	44
5	49	5	56	2	0	5	45
5	50	5	54	3	17	6	43
5	51	5	53	4	34	7	36
5	52	5	51	sets.		8	24
5	53	5	49	6	6	9	7
5	54	5	48	6	40	9	58
5	55	5	46	7	20	10	40
5	56	5	44	8	9	11	33

CALENDAR

For Washington, Maryl'd, Virginia, Kent'ky, Miss'ri, and California.

SUN RISES. H	M	SUN SETS. H	M	MOON SETS. H	M
5	29	6	31	8	50
5	30	6	29	9	33
5	31	6	28	10	23
5	32	6	26	11	20
5	33	6	25	morn.	
5	33	6	23	0	23
5	34	6	22	1	27
5	35	6	20	2	32
5	36	6	18	3	36
5	37	6	17	4	35
5	38	6	15	rises.	
5	39	6	14	6	25
5	40	6	12	6	47
5	41	6	11	7	11
5	41	6	9	7	39
5	42	6	7	8	12
5	43	6	6	8	51
5	44	6	4	9	39
5	45	6	2	10	36
5	46	6	1	11	45
5	47	5	59	morn.	
5	48	5	58	0	51
5	49	5	56	2	5
5	50	5	54	3	20
5	51	5	53	4	35
5	51	5	51	sets.	
5	52	5	50	6	10
5	53	5	48	6	45
5	54	5	46	7	27
5	55	5	45	8	16

N. A. Ayrshire Register. vol. 2d. By Sturtevant Brothers, South Framingham, Mass. March 15, 1877.
National Association of Trotting Horse Breeders Established. Jan. 4. 1877.
National Wool-Growers' Association Re-organized at Cleveland March 1, 1877.
New-England Agricultural Exhibition at Portland, Me Sept 13. 1877.
New N. Y. Dairyman's Association Organized at Syracuse. March 22. 1877.
Pennsylvania State Board of Agriculture Established Nov. 16. 1876; Feb. 8, 1877.
Percheron-Norman Stud Book By J. H. Sanders, Chicago Feb. 8. 1877.
Photograph instantaneously taken of a Horse at full speed. Aug. 23. 1877.

MOON'S PHASES.	D.	BOSTON. H. M.	NEW-YORK. H. M.	WASHINGT'N H. M.	SUN ON MERID. D.	H. M. S.
FIRST QUARTER,	3	2 17 mo.	2 5 mo.	1 53 mo.	1	11 49 36
FULL MOON, . . .	11	4 10 mo.	3 58 mo.	3 46 mo.	9	11 47 15
THIRD QUARTER,	19	2 26 mo.	2 14 mo.	2 2 mo.	17	11 45 22
NEW MOON, . . .	25	6 14 ev.	6 2 ev.	5 50 ev.	25	11 44 8

CALENDAR

For Boston, New-England, New-York State, Michigan, Wisconsin, Iowa, and Oregon.

DAY OF MONTH.	DAY OF WEEK.	SUN RISES H	SUN RISES M	SUN SETS. H	SUN SETS. M	MOON SETS. H	MOON SETS. M	H. W. BOST'N H	H. W. BOST'N M
1	T	5	57	5	42	8	58	2	47
2	W	5	58	5	40	10	1	3	43
3	T	6	0	5	39	11	7	4	43
4	F	6	1	5	37	morn.		5	48
5	S	6	2	5	35	0	14	6	50
6	F	6	3	5	33	1	20	7	45
7	M	6	4	5	32	2	23	8	35
8	T	6	5	5	30	3	25	9	20
9	W	6	6	5	28	4	25	10	3
10	T	6	7	5	27	5	26	10	43
11	F	6	8	5	25	rises.		11	22
12	S	6	10	5	24	5	34	11	57
13	F	6	11	5	22	6	3	ev.	32
14	M	6	12	5	20	6	38	1	9
15	T	6	13	5	19	7	22	1	50
16	W	6	14	5	17	8	15	2	36
17	T	6	16	5	15	9	16	3	25
18	F	6	17	5	14	10	25	4	20
19	S	6	18	5	12	11	36	5	20
20	F	6	19	5	11	morn.		6	24
21	M	6	20	5	9	0	51	7	27
22	T	6	21	5	8	2	6	8	25
23	W	6	23	5	6	3	23	9	22
24	T	6	24	5	5	4	42	10	18
25	F	6	25	5	3	sets.		11	12
26	S	6	26	5	2	5	6	morn.	
27	F	6	28	5	0	5	50	0	2
28	M	6	29	4	59	6	44	0	49
29	T	6	30	4	58	7	47	1	40
30	W	6	31	4	56	8	54	2	34
31	T	6	33	4	55	10	3	3	27

CALENDAR

For New-York City, Philadelphia, Connecticut, N. Jersey, Penn., Ohio, Indiana and Illinois.

SUN RISES H	SUN RISES M	SUN SETS. H	SUN SETS. M	MOON SETS. H	MOON SETS. M	H. W. N. Y. H	H. W. N. Y. M
5	57	5	43	9	5	morn.	
5	58	5	41	10	8	0	29
5	59	5	39	11	13	1	29
6	0	5	38	morn.		2	34
6	1	5	36	0	19	3	36
6	2	5	34	1	24	4	31
6	3	5	33	2	26	5	21
6	4	5	31	3	26	6	6
6	5	5	30	4	26	6	49
6	6	5	28	5	25	7	29
6	7	5	26	rises.		8	8
6	8	5	25	5	38	8	43
6	9	5	23	6	8	9	18
6	10	5	22	6	45	9	55
6	12	5	20	7	29	10	36
6	13	5	19	8	22	11	22
6	14	5	17	9	23	ev.	11
6	15	5	16	10	30	1	6
6	16	5	14	11	41	2	6
6	17	5	13	morn.		3	10
6	18	5	11	0	54	4	13
6	19	5	10	2	8	5	11
6	20	5	9	3	24	6	8
6	21	5	7	4	41	7	4
6	23	5	6	sets.		7	58
6	24	5	4	5	11	8	48
6	25	5	3	5	57	9	35
6	26	5	2	6	51	10	26
6	27	5	0	7	54	11	20
6	28	4	59	9	1	morn.	
6	30	4	58	10	8	0	13

CALENDAR

For Washington, Maryl'd, Virginia, Kent'ky, Miss'ri, and California.

SUN RISES H	SUN RISES M	SUN SETS. H	SUN SETS. M	MOON SETS. H	MOON SETS. M
5	56	5	43	9	12
5	57	5	42	10	15
5	58	5	40	11	20
5	59	5	39	morn.	
6	0	5	37	0	24
6	1	5	35	1	27
6	2	5	34	2	28
6	3	5	33	3	28
6	4	5	31	4	26
6	5	5	29	5	24
6	6	5	28	rises.	
6	7	5	26	5	43
6	8	5	25	6	14
6	9	5	23	6	51
6	10	5	22	7	36
6	11	5	21	8	29
6	12	5	19	9	30
6	13	5	18	10	36
6	14	5	16	11	46
6	15	5	15	morn.	
6	16	5	14	0	57
6	17	5	12	2	10
6	18	5	11	3	24
6	19	5	10	4	40
6	20	5	8	sets.	
6	21	5	7	5	17
6	22	5	6	6	3
6	23	5	5	6	58
6	24	5	3	8	2
6	25	5	2	9	7
6	26	5	1	10	14

Pocket Geologist. By F. H. Smith, Baltimore. June 21, 1877.
Poland Chinas Exported to England. Sept. 27, 1877.
Potato Pests. By C. V. Riley. New-York: O. Judd Co. Jan. 11, 1877.
Poultry Diseases. By Geo. P. Burnham Melrose, Mass. Nov. 2, 1876.
Riley's Ninth Report on the Insects of Missouri. May 10, 1877.
Rinderpest—an outbreak in Great Britain. March 15, 1877.
Roots for Stock Feeding. By David Landreth & Sons, Philadelphia. July 5, 1877.
Royal Agricultural Society's Exhibition at Liverpool. Aug. 2, 1877.

MOON'S PHASES.	D.	BOSTON. H. M.	NEW-YORK. H. M.	WASHINGT'N H. M.	SUN ON MERID. D.	H.	M.	S.
FIRST QUARTER,	1	5 7 ev.	4 55 ev.	4 43 ev.	1	11	43	42
FULL MOON, . . .	9	9 50 ev.	9 38 ev.	9 26 ev.	9	11	43	59
THIRD QUARTER,	17	1 14 ev.	1 2 ev.	0 50 ev.	17	11	45	9
NEW MOON, . . .	24	4 27 mo.	4 15 mo.	4 3 mo.	25	11	47	14

DAY OF MONTH.	DAY OF WEEK.	CALENDAR For Boston, New-England, New-York State, Michigan, Wisconsin, Iowa, and Oregon. SUN RISES	SUN SETS.	MOON SETS.	H. W. BOST'N	CALENDAR For New-York City, Philadelphia, Connecticut, N. Jersey, Penn., Ohio, Indiana and Illinois. SUN RISES	SUN SETS.	MOON SETS.	H. W. N. Y.	CALENDAR For Washington, Maryl'd, Virginia, Kent'ky, Miss'ri, and California. SUN RISES	SUN SETS	MOON SETS.
		H M	H M	H M	H M	H M	H M	H M	H M	H M	H M	H M
1	F	6 34	4 54	11 10	4 21	6 31	4 57	11 14	1 7	6 28	5 0	11 19
2	S	6 35	4 52	morn.	5 15	6 32	4 56	morn.	2 1	6 29	4 59	morn.
3	F	6 36	4 51	0 15	6 9	6 33	4 54	0 18	2 55	6 30	4 58	0 21
4	M	6 37	4 50	1 17	7 1	6 34	4 53	1 19	3 47	6 31	4 57	1 21
5	T	6 39	4 49	2 18	7 49	6 35	4 52	2 18	4 35	6 32	4 55	2 19
6	W	6 40	4 48	3 18	8 33	6 37	4 51	3 18	5 19	6 33	4 55	3 17
7	T	6 41	4 46	4 18	9 18	6 38	4 50	4 17	6 4	6 34	4 53	4 15
8	F	6 43	4 45	5 21	10 2	6 39	4 49	5 18	6 48	6 35	4 52	5 15
9	S	6 44	4 44	rises.	10 47	6 40	4 48	rises.	7 33	6 36	4 52	rises.
10	F	6 45	4 43	4 40	11 30	6 41	4 47	4 46	8 16	6 37	4 51	4 52
11	M	6 46	4 42	5 21	ev. 11	6 43	4 46	5 28	8 57	6 39	4 50	5 36
12	T	6 48	4 41	6 11	0 51	6 44	4 45	6 19	9 37	6 40	4 49	6 26
13	W	6 49	4 40	7 11	1 35	6 45	4 44	7 17	10 21	6 41	4 48	7 24
14	T	6 50	4 39	8 15	2 22	6 46	4 43	8 22	11 8	6 42	4 47	8 28
15	F	6 51	4 38	9 26	3 11	6 47	4 42	9 31	11 57	6 43	4 47	9 36
16	S	6 53	4 37	10 38	4 1	6 48	4 41	10 41	ev. 47	6 44	4 46	10 45
17	F	6 54	4 37	11 50	4 54	6 50	4 41	11 52	1 40	6 45	4 45	11 55
18	M	6 55	4 36	morn.	5 52	6 51	4 40	morn.	2 38	6 47	4 44	morn.
19	T	6 56	4 35	1 4	6 52	6 52	4 39	1 5	3 38	6 48	4 44	1 6
20	W	6 57	4 34	2 18	7 51	6 53	4 39	2 18	4 37	6 49	4 43	2 17
21	T	6 58	4 34	3 35	8 50	6 54	4 38	3 33	5 36	6 50	4 43	3 31
22	F	7 0	4 33	4 55	9 50	6 55	4 37	4 52	6 36	6 51	4 42	4 48
23	S	7 1	4 32	sets.	10 52	6 56	4 37	sets.	7 38	6 52	4 41	sets.
24	F	7 2	4 32	4 26	11 49	6 58	4 36	4 34	8 35	6 53	4 41	4 41
25	M	7 3	4 31	5 26	morn.	6 59	4 36	5 33	9 24	6 54	4 41	5 41
26	T	7 5	4 30	6 34	0 38	7 0	4 35	6 41	10 11	6 55	4 40	6 48
27	W	7 6	4 30	7 44	1 25	7 1	4 35	7 50	11 1	6 56	4 40	7 56
28	T	7 7	4 30	8 55	2 15	7 2	4 34	8 59	11 48	6 57	4 39	9 4
29	F	7 8	4 29	10 2	3 2	7 3	4 34	10 6	morn.	6 58	4 39	10 9
30	S	7 9	4 29	11 6	3 47	7 4	4 34	11 8	0 33	6 59	4 39	11 10

St Louis Exposition for 1877—receipts. $53.869. Oct. 11, 18, 1877.
Self-Binding American Reapers Tested in England. Sept. 13. 1877.
Shirriff. Patrick. a prominent Scottish Agriculturist and Author. Obituary. Jan. 18, 1877.
Signal Service Report for 1876—171 Stations in operation. April 19, 1877.
South America Exporting Fresh Beef to England. Aug 30; Sept. 13, 1877.
Southern Poultry Society Organized at Mobile Oct. 26. 1877.
Steamed Feed for Sheep. Interesting Experiments by A. C. Wales. Jan. 4. 1877.
Swine Herd-Register for Breeders. By Geo. Jackson. Indianapolis. Sept. 13, 1877.
Swine Husbandry. By F. D. Coburn. New-York: Orange Judd Co. July 19, 1877.

MOON'S PHASES.	D.	BOSTON. H. M.	NEW-YORK. H. M.	WASHINGT'N H. M.
FIRST QUARTER,	1	11 53 mo.	11 41 mo.	11 29 mo.
FULL MOON, . . .	9	3 6 ev.	2 54 ev.	2 42 ev.
THIRD QUARTER,	16	10 20 ev.	10 8 ev.	9 56 ev.
NEW MOON, . . .	23	4 40 ev.	4 28 ev.	4 16 ev.
FIRST QUARTER,	31	9 13 mo.	9 1 mo.	8 49 mo.

SUN ON MERID. D.	H.	M.	S.
1	11	49	19
9	11	52	39
17	11	56	27
25	12	00	26
31	12	03	23

CALENDAR

For Boston, New-England, New-York State, Michigan, Wisconsin, Iowa, and Oregon.

CALENDAR

For New-York City, Philadelphia, Connecticut, N. Jersey, Penn., Ohio, Indiana and Illinois.

CALENDAR

For Washington, Maryl'd, Virginia, Kent'ky, Miss'ri, and California.

DAY OF MONTH.	DAY OF WEEK.	SUN RISES	SUN SETS.	MOON SETS.	H. W. BOST'N	SUN RISES	SUN SETS.	MOON SETS.	H. W. N. Y.	SUN RISES	SUN SETS.	MOON SETS.
		H M	H M	H M	H M	H M	H M	H M	H M	H M	H M	H M
1	F	7 10	4 29	morn.	4 32	7 5	4 33	morn.	1 18	7 0	4 39	morn.
2	M	7 11	4 28	0 8	5 19	7 6	4 33	0 9	2 5	7 1	4 38	0 10
3	T	7 12	4 28	1 8	6 8	7 7	4 33	1 8	2 54	7 2	4 38	1 8
4	W	7 13	4 28	2 8	6 56	7 8	4 33	2 8	3 42	7 3	4 38	2 6
5	T	7 14	4 28	3 10	7 45	7 9	4 33	3 8	4 31	7 4	4 38	3 5
6	F	7 15	4 27	4 13	8 34	7 10	4 33	4 9	5 20	7 5	4 38	4 6
7	S	7 16	4 27	5 17	9 24	7 11	4 33	5 12	6 10	7 6	4 38	5 7
8	P	7 17	4 27	6 20	10 17	7 12	4 33	6 14	7 3	7 7	4 38	6 9
9	M	7 18	4 27	rises.	11 8	7 13	4 33	rises.	7 54	7 7	4 38	rises.
10	T	7 19	4 27	5 3	11 54	7 14	4 33	5 10	8 40	7 8	4 38	5 17
11	W	7 20	4 27	6 8	ev. 38	7 14	4 33	6 14	9 24	7 9	4 38	6 21
12	T	7 20	4 28	7 17	1 21	7 15	4 33	7 22	10 7	7 10	4 38	7 28
13	F	7 21	4 28	8 30	2 8	7 16	4 33	8 34	10 54	7 10	4 38	8 38
14	S	7 22	4 28	9 42	2 51	7 17	4 33	9 44	11 37	7 11	4 39	9 47
15	P	7 23	4 28	10 53	3 37	7 17	4 34	10 54	ev. 23	7 12	4 39	10 56
16	M	7 24	4 29	morn.	4 25	7 18	4 34	morn.	1 11	7 13	4 39	morn.
17	T	7 24	4 29	0 6	5 20	7 19	4 34	0 6	2 6	7 13	4 40	0 5
18	W	7 25	4 29	1 19	6 19	7 19	4 35	1 18	3 5	7 14	4 40	1 16
19	T	7 25	4 30	2 35	7 23	7 20	4 35	2 31	4 9	7 14	4 40	2 29
20	F	7 26	4 30	3 52	8 27	7 20	4 35	3 48	5 13	7 15	4 41	3 44
21	S	7 26	4 30	5 10	9 33	7 21	4 36	5 5	6 19	7 15	4 41	4 59
22	P	7 27	4 31	6 23	10 38	7 21	4 36	6 17	7 24	7 16	4 42	6 11
23	M	7 27	4 32	sets.	11 37	7 22	4 37	sets.	8 23	7 16	4 42	sets.
24	T	7 28	4 32	5 21	morn.	7 22	4 38	5 27	9 10	7 17	4 43	5 34
25	W	7 28	4 33	6 35	0 24	7 23	4 38	6 40	9 52	7 17	4 44	6 43
26	T	7 29	4 33	7 43	1 6	7 23	4 39	7 47	10 34	7 18	4 44	7 51
27	F	7 29	4 34	8 50	1 48	7 23	4 39	8 53	11 15	7 18	4 45	8 55
28	S	7 29	4 35	9 54	2 29	7 24	4 40	9 55	11 54	7 18	4 46	9 57
29	P	7 29	4 36	10 56	3 8	7 24	4 41	10 56	morn.	7 19	4 46	10 56
30	M	7 30	4 36	11 57	3 47	7 24	4 42	11 56	0 33	7 19	4 47	11 55
31	T	7 30	4 37	12 57	4 28	7 24	4 43	12 55	1 14	7 19	4 48	12 52

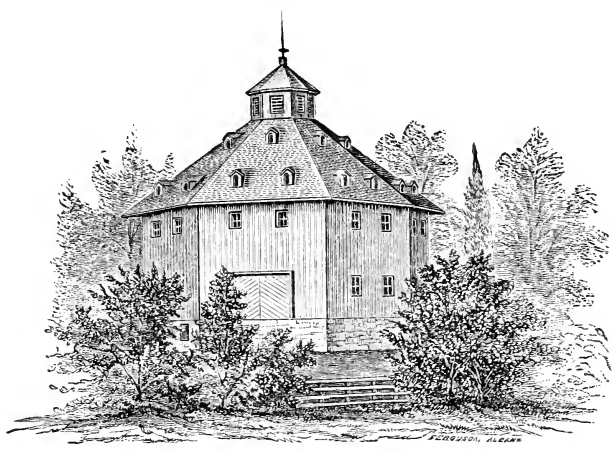
Thomson. H C., Toronto, Sec'y Ontario Board of Agriculture. Obituary. Feb. 22. 1877.
Towneley. Col., a prominent English Short-Horn Breeder Obituary. Nov 23, 1876.
U. S. Merino Sheep Register—1st volume. By the Ohio Wool-Growers' Association. May 10, 1877.
Wheat Crop of the Northwest for 1877, estimated at 117,000,000 bush. Aug. 23, 1877.
Whitman. S. S., Little Falls N. Y. Obituary Oct 11. 1877.
Winans, Ross, Baltimore. Md. Obituary. April 19. 1877.

THE

ILLUSTRATED ANNUAL REGISTER

OF

RURAL AFFAIRS.



CONSTRUCTION OF BARNS.

IT WAS A FORMER PRACTICE to place the barn buildings in the form of a hollow square, surrounding and sheltering the cattle and manure yard. The practice is now becoming more common and approved to group nearly all the accommodations in one building, as it is more compact, less expensive in erection, is warmer in winter, and saves much labor in attendance by placing everything near at hand.

The old practice of scattering buildings over the farm, to save drawing crops, has been found more expensive than to concentrate them, the saving

of labor in drawing being less than that of passing to the buildings two or three times a day in winter. It is cheaper to draw a load of hay half a mile in summer, than to go the half mile a dozen times in feeding it out.

The Required Size.

The farmer who is about to erect new farm buildings, or to add to his old ones, should first figure up on what he will wish to store in them. These contents will depend entirely on the size of his farm, the character of his farming, the number of domestic animals of each kind, and the amount of the farm machinery, for which he should have ample shelter. Among these contents he may enumerate :

1. Space required for hay—the bays or mows.
2. do. do. unthreshed grain—the bays.
3. do. do. threshed grain—the granary.
4. do. do. cattle—the stables.
5. do. do. horses—the stables.
6. do. do. sheep—the sheds and pens.
7. do. do. wagons in use—shed or house.
8. do. do. storing all tools—large tool room and place for storing machines.

The piggery, poultry-house and corn-house may be in separate buildings, and the repair shop attached to either of the latter.

Every barn should have a basement, both for the sake of the room it affords at moderate cost, and for the protection of the sills and other timbers of the barn, if built of wood. The foundation should be of substantial masonry, below frost, and with perfect drainage throughout. The earth is best if dry gravel ; but farmers have to take such soil as they find, and if moist or clayey, it requires the most thorough system of tile or broken-stone drains throughout. The ground, if possible, should be sloping, to make drainage easy, and to open freely to the apartments from the yard below, as well as to provide a sloping bank for entering above. The basement may be occupied with the root cellar, water troughs, cattle stables, and, to a certain extent, and under special precautions, with manure. It is too damp for horse stables, unless the ground is dry gravel, and the whole made free from dampness. If the ground is retentive of moisture, it must be not only well drained, but a space of a foot or more between the foundation walls and the earth bank should be filled with broken stone or gravel, connected with a drain below. This will not only protect the walls from the heaving of frost, or the pressure of earth, but make the stables much drier.

Since the introduction of the horse-fork, three-story barns are not so important as formerly, although still possessing some valuable advantages, and barns may be built higher than before, and more room thus secured under the same extent of roof. A height of not less than 20 feet from basement walls to eaves may be adopted.

Whatever may be the capacity or character of barns and their surroundings, or their expense or cheapness, the farmer should adopt the determination at the outset that everything shall be kept in neat and perfect order. If he has large means, he can indulge in some degree of elegance and architectural beauty; if his means are small, he may have convenience and cleanliness, instead of awkwardness and repulsiveness, with no additional expense. If he cleans his piggery twice a day, and keeps it free from all offensive odor, he has no more of cleanings to throw out in the aggregate than if he cleaned it but once a week. A free use of litter and absorbents in his stables and manure heaps, and good ventilators, will prevent fœtid fumes, and give him healthy animals.

Details of Estimate.

To come to the details of required space, it will not be difficult to estimate them with some accuracy. We will take an example: Suppose he has a good farm of 100 improved acres; 20 acres are in meadow, yielding 40 tons of hay; 20 acres in wheat, oats and barley, yielding about the same bulk before threshing; he has 5 acres of sown corn-fodder, a part of which he wishes to store in different parts of his barn, and a part he will leave in small, ventilated stacks for late fall feeding; he keeps 100 sheep, 4 horses, 10 head of cattle, and 10 pigs. Among his tools and machines needing storage and shelter he has two farm wagons, a mower and reaper, seed drill, two horse-rakes, with a number of smaller articles, such as harrows, cultivators and various hand tools.

Now, the 40 tons of hay should have 600 cubic feet per ton allotted, allowing for settling and space to work, and the same space for the unthreshed grain—which will be 600 times 80, or 48,000 cubic feet for hay and grain. These would require a bay 20 feet wide, 80 feet long, and 20 feet high, and another half this bulk, or 10 feet high; or equivalent space. As these bays settle in autumn, a quantity of fodder-corn may be placed on them, for feeding out early in winter. The four horses will need a space 14 by 20 feet for stables; the 10 cattle, if stabled, will require about twice this room; and the 100 sheep should have a sheltered space under the barn or sheds.

The tool-room or wagon-house should have a space equal to 20 by 30 feet in all.

It will be seen by this estimate that many barns are quite too small, and if the farm goes on improving in fertility and products, as most farms should in good hands, the room provided should be larger rather than smaller. In other words, a barn large enough to house and handle its products and machinery, should be equal to a building 40 by 60 feet, 20 feet posts, and a basement under the whole with at least 8-foot walls.

Exterior Covering.

The question has been discussed whether well built wood barns, with planed and thoroughly painted sides, are not cheaper in the long run than

buildings covered with rough boards and not painted. The interest on the additional cost of high-priced, planed boards, and of frequent painting, it is claimed, will be sufficient to replace a new covering every twenty years with rough and cheaper material. This question may be easily settled by any one, by ascertaining from a builder the cost of say 10,000 feet of surface planed and painted, and of 10,000 feet of cheap and rough boards.

There are, however, other considerations than cheapness in the erection of farm buildings. It has been too common in some places to give no attention whatever to ornamental or picturesque appearance. Hence the common remark that trees should be planted to hide the repulsive barns. The true rule, on the contrary, is to render every part of the premises neat and attractive. The barn should be a pleasing object; it should convey to the eye of the spectator the impression of comfort and completeness in the farm arrangements. A farm with a dwelling-house alone visible would seem to be only partially furnished. It may therefore be well for every farmer who has the means, to give to all his outbuildings an attractive exterior and finish; and even those who have small resources, may have symmetry and architectural character to a rough building, on the same principle that well executed rustic work is better than costly and elaborate structures without taste.

The remainder of this article is chiefly occupied with designs of barns, furnished by several distinguished agriculturists, who have given special attention to the arrangement and construction of farm buildings; taken together, the designs comprise a series of much excellence and practical value.

Prof. Roberts' Barn.

The plan of the barn furnished by Prof. J. P. Roberts of Cornell Univer-

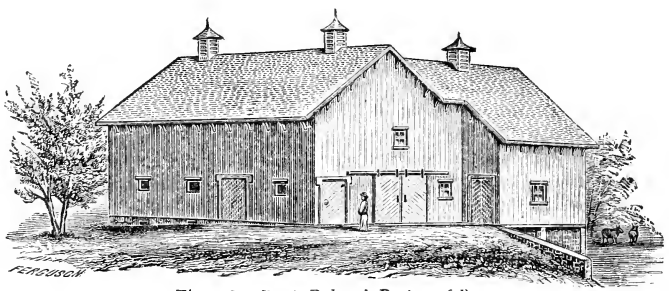


Fig. 308.—*Prof. Roberts' Design of Barn.*

sity, contains many excellent arrangements and provisions The basement is 9 feet; posts, 20 feet. The main floor is 40 by 60 feet, with a wing of the same height, 30 by 40 feet, (fig. 308.)

Fig. 309 is a plan of the principal floor. A drive or floor twelve feet wide extends lengthwise through the main portion. On the left is a cow-stable for fifteen animals; on the right are stalls for seven horses, a granary, and a passage where the threshing machine is placed when used. If desired, the horse stables, or a part of them, may be box stalls; or they may be made into cattle stables; or, if less stable room is desired, and more floor or grain room, the stalls may be

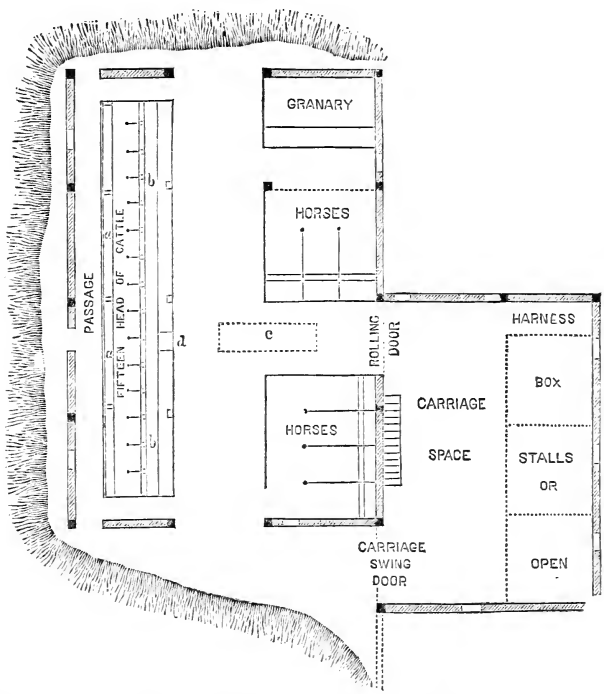


Fig. 309.—*Principal Floor—Main portion*, 40 *by* 60 *feet*; *Wing*, 30 *by* 40 *feet*; *Cow Stable*, 13 *feet wide—Stalls*, 3½ *feet wide*; *Horse Stable*, 14 *feet wide—Stalls*, 4¼ *feet*; a a, *Manure Gutter*; b b, *Stanchions*; c, *Position of Threshing Machine*; d, *Movable Boards to admit Band from outside.*

omitted altogether, or in part. The wing is used as a space for carriages or wagons, and the three box stalls may give place to more wagon room if desired. The slope of the ground allows sufficient rise to drive wagons through, and the left side of the basement is mostly protected by a bank. The next floor at the front entrance is a few feet higher for a portion of the distance, to allow high loads of hay to pass,

till pitched off with a horse-fork. The rest of the distance is lower, to allow more space to the loft. Fig. 310 is a plan of the grounds.

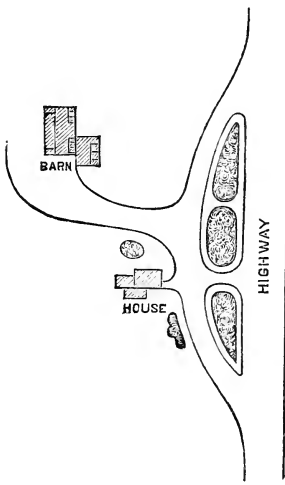


Fig. 310.—*Plan of Grounds.*

DETAILS.—The platform on which the cattle stand is 4 feet 9 inches wide at one end, for the larger cattle, and 4 feet 5 inches at the other for the smaller —(fig. 311.) When cattle vary much in size, a greater difference may be necessary. If too narrow or short, it causes abortion; if too wide, the animals become soiled in lying down.

The best way is to place the cows rather compactly together, and then if there is but one milker, to begin at one end, and as soon as each cow is milked, to turn her out, thus leaving room for the next one. If there are more cows than one man can milk, others can begin at regular intervals, and as soon as one cow is discharged, ample room is made for the rest.

A peculiar and special provision for clearing away the droppings is adopted in this stable. The manure gutter (*a a*, fig. 309), 18 inches wide

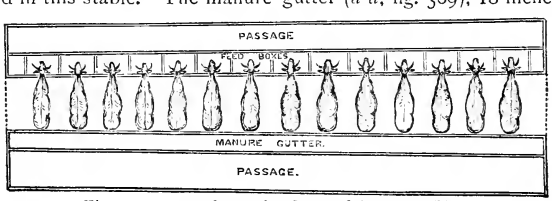


Fig. 311.—*Stanchions for Cows of Varying Size.*

and 8 inches deep, has a movable 2-inch plank, 8 inches wide, forming the rear side, spiked to another 2-inch plank along their edges, at right angles, as shown in cross-section by fig. 312. When the mamure is to be cleaned from the trough, this movable portion is lifted by turning at its hinges, as shown in the cut, making an opening at the rear side of the manure trough, through which the manure is rapidly thrown with a shovel to the manure cellar below, and when it is thus cleared, the plank cover is replaced, and all is closed. Each of the movable plank

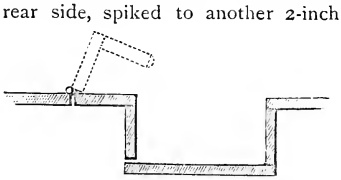


Fig. 312.—*Section of Manure-trough, with mode of throwing open rear side.*

covers are 14 feet long, and the trough is divided into four portions. The troughs are held in their places at the ends by a bent iron bar or stirrup, in the shape shown by fig. 313. If the trough is too shallow, the cattle will stand in it; 8 inches proves the best in depth.

Fig. 313. — *Iron-rod Stirrup for holding Manure Trough.*

The platforms on which the cows stand slope about one inch from stanchions to manure gutter. The stanchions are made of hard wood, planed and oiled. They incline slightly from the cattle, so that in rising there is room enough for the forward movement of their heads, as shown in fig. 314.

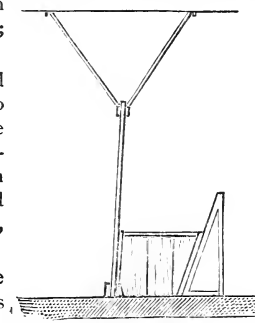


Fig. 314.—*Section of Feed-boxes and Stall-yokes.*

Short windows to the line of the cow stables are placed so high as to be out of the reach of the animals, and the sash is made to slide horizontally, and may thus be opened to any degree for the admission of air.

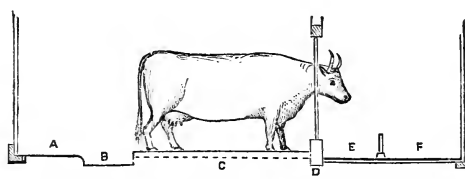


Fig. 315.—*Vertical Cross-Section of Stable*—A, *Passage*; B, *Manure-gutter*; C, *Platform*; D, *Stanchions, which should incline slightly from the Cows' heads*; E, *Feed-boxes*; F, *Passage.*

In using the threshing machine, the engine or horse-power is placed at the left, on the outside of the building. For this purpose the driving-belt passes through the open door, and the feeding box *d* (fig. 309) being movable, it passes directly to the threshing machine *c*, from which the straw is taken by the carrier to the loft over the carriage-house, and is packed away by men standing above to receive it. The unthreshed grain, occupying the space over the granary and horse-stables (or the whole space if a part or all the stables are omitted), is easily pitched to the machine. If these stables are omitted, the horses may occupy the stalls in place of the boxes in the wing, and such portion of the loft above as may be desired devoted to space for the straw.

Fig. 316.—*Section of Floor of Horse-stables.*

The floors of the horse-stables are made of scantling, 2 by 4 inches, set on edge, with spaces between them of a fourth of an inch—fig. 316. These spaces are left open for about 2½ feet near the horses' hind legs, where their droppings fall, and

the rest is closed by thin boards on edge between them. The advantages of this floor are in allowing the drainage or liquid manure to pass through into the basement, leaving the horse manure comparatively dry, which is then wheeled across the floor to the cow-stalls, and used as bedding, and becoming thus mixed with the cow droppings, makes a better manure than when they are kept separate. It makes a soft bed for the cows, and prevents the hair from wearing off the knees, produced by rising on a hard floor. The constant drainage causes the floor to last longer. To prevent the liquid manure from dropping all along these openings to the floor of the basement, a board trough 2½ feet wide is hung under the openings, lower at one end, and whenever the stables are cleaned, this trough is also cleaned with a light long-handled hoe.

Fig. 317 is a section of the mode of framing the truss of the wing or wagon-house, so as to clear all obstructions. It is, of course, used only for the interior of the wing, and not for the outer walls, where it is not needed. It will be observed that the braces are set in the horizontal timbers a short distance from the ends, so as not to crowd against the wall.

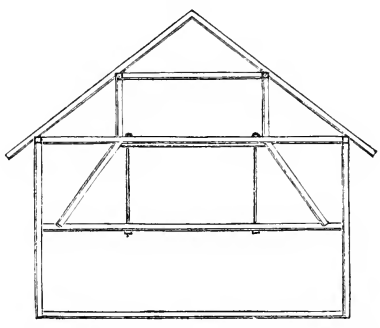


Fig. 317.—*Mode of Framing Truss of Wagon-house, leaving the lower floor clear of all obstructions—20-foot posts.*

The barn floor, extending lengthwise through the main barn, should be made of plank laid lengthwise,(and not across, as is common,) as this position of the plank makes a smoother floor, and which is not so soon worn out. Another advantage of this mode is dispensing entirely with cross timbers, the joists being laid across the floor and the floors of part of the stables, and serving as ties. In order to secure their ends firmly, a hole is bored with an auger near the ends, after they are laid, one-half of the hole being cut in the joist and the other in the timber. A

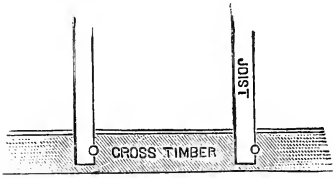


Fig. 318.—*Mode of Securing the Ends of Joists.*

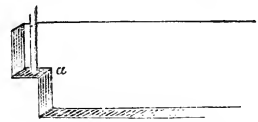


Fig. 319.—*Joist with weak Tenon.*

round wooden pin driven into this hole renders them immovable—fig. 318. This is a simple and rapid way to fasten them.

Fig. 319 shows the common way of making the tenons on joists, half

being cut away, they are weakened, and are liable to split at *a*. If the tenon is made wider, the cross timber is weakened to receive it. A better form is shown in fig. 320, where the tenon receives nearly all the strength of the joist, and the cross timber, being cut to receive this peculiar form, is weakened but slightly.

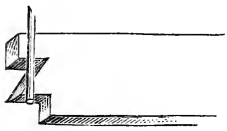


Fig. 320.
Joist with strong Tenon.

Fig. 321 is a section of the meal-bin, its contents being always accessible at the lid, *a*, shown lifted by the dotted lines. Joists at bottom laid near together and covered with a wire screen, give ventilation and exclude mice. The sides are smooth hemlock, which mice will not gnaw.

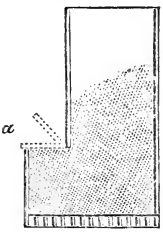


Fig. 321.
Section of Feed-bin.

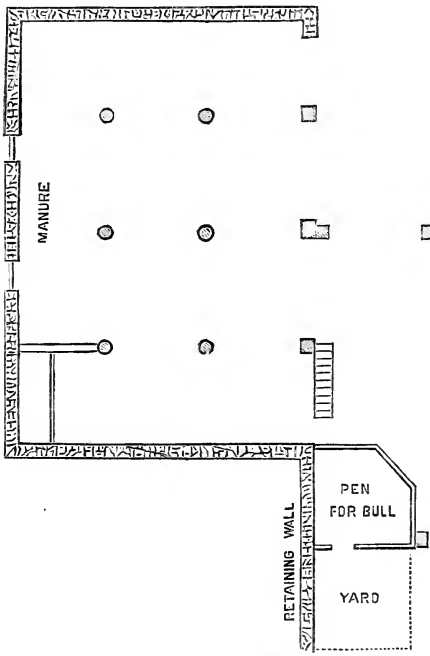


Fig. 322.—*Basement—9 feet high.*

The basement (fig. 322) is used for manure on the left side, or under the cattle, and the rest may be occupied with wagons, carts, plows and

coarse implements generally, and also as a shed for animals. The box for the bull is placed next the retaining wall; and outside of this is a small yard for exercise. He is easily seen from the bank above. The box is boarded vertically, and not horizontally, as he easily hooks or tears off horizontal boards. If this box and yard are not needed for a bull, a stallion, or colts, may be kept there.

The bank, which extends around the three sides of the basement, is best if the building is so arranged that it is on the west side. But if this position cannot be controlled, the barn must be made to fit the position according to circumstances. The three sides must be solid stone wall. In building it, the excavation should be nearly a foot wider than the space which the wall will occupy, which should be built up nearly smooth on the outside; otherwise the projecting points of the larger stones used in building it, against the earth, render it less secure, and the freezing and thawing of the earth tend to loosen and overthrow the wall. Under this space, between wall and earth, should be a drain, 8 or 10 inches below the bottom of the wall, with a pipe tile. The space is then filled with gravel or small or broken stone.

The posts in the basement are simply the trunks of white oak trees, or other hard and durable wood, with the bark removed. These are better and smoother than square posts with their corners. Projecting knots or short stubs of limbs towards the top may serve as pins for hanging up tools

Cattle Barn at Michigan Agricultural College.

Through the assistance of Prof. Beal we are enabled to give a plan and

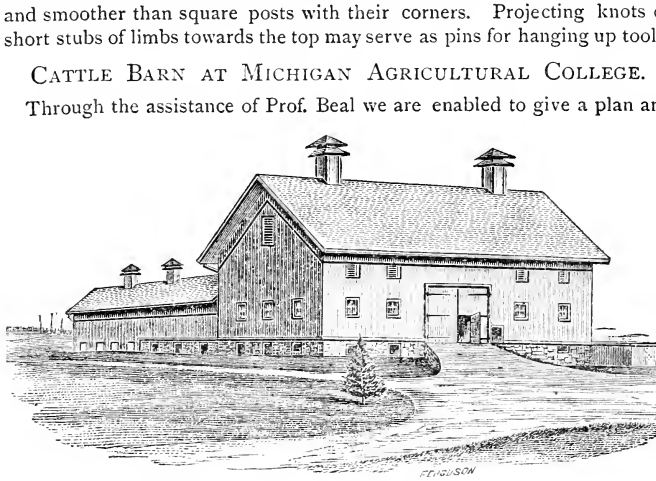


Fig. 323.—*Cattle Barn at Michigan Agricultural College, from the Southwest.*

description of the cattle barn on the grounds of the State Agricultural College at Lansing, Michigan; and although Prof. Beal thinks it is not a perfect model, it will be found to possess many points of value, which farmers who are about to build may imitate.

It is a side-hill barn, 40 by 60 feet, with the end to the south, at which, as seen in the basement plan, (fig. 324,) are double doors, and on each side of these, near the corners, are 4-foot doors, for the passage of the cattle. The central alley is 12 feet wide, the floor of which, and that of the stalls on each side, are all tarred and placed upon a grout bottom, so that there can be no rat-holes beneath. The stalls for the cattle extend along on each side of this central alley. The earth being banked against the outer walls of the apartment for roots, prevents freezing; and the room for mixing the feed is partly protected in the same way.

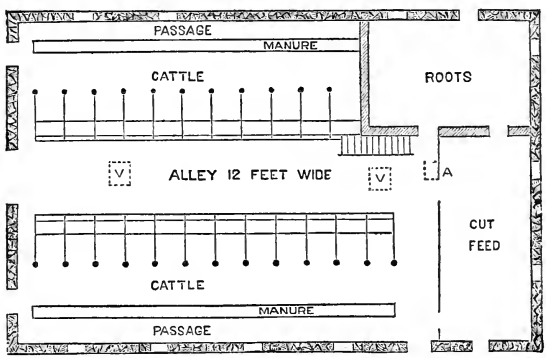


Fig. 324.—*Basement*—A, *Root Pulper*; V V, *Ventilators and Hay Shoots from Doors at different heights.*

The planks forming the mangers next the cattle are movable, so that by taking them out and dropping them into grooves for the purpose, the space between the mangers and the manure gutters may be increased or diminished according to the size of the cattle. The planks forming the sides of the manger next the alley, should be slanting, or wider at the top, to make it easier to put in the feed, as well as to prevent the cattle from scattering the food over into the alley. The cattle are fastened with a chain about the neck, with the other end attached to a vertical rod at the side of each stall. As the ring moves freely up and down, ample room is given to the animals. In the rear are low windows Over the passage at the rear are two ventilators, 3 feet square, reaching to the roof. The roots are conveyed through side windows into the root room. At *A* is a root-pulping machine, driven by a tread-power above.

The stalls vary in width from $3\frac{1}{2}$ to 4 feet. From the edge of the manure trough to the end of the stall next the alley is $7\frac{1}{2}$ feet for large cows, and 6 feet 7 inches for small ones, with intermediate dimensions as required. The slanting planks dividing the stalls and alley are movable, and drop into grooves at different distances, so that the stalls may be made long or short at pleasure, with similar ones for mangers. The mangers are 2 feet

wide inside. Th manure gutters are 20 inches wide, and about 5 inches deep. The manure is wheeled out with a wheelbarrow. The passage at the rear ot the stalls is 3½ feet wide. The basement walls are 2 feet 9 inches thick at bottom, tapering upwards on the inside to 15 inches at the top.

On the floor above (fig. 325) is a cutting machine and stalks, straw, &c., cut by horse-power, and run down a spout, after cutting, into the feed

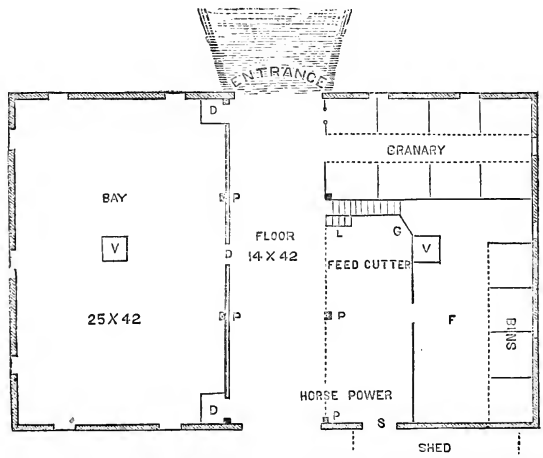


Fig. 325.—*Second Floor*—D D D, *Doors opening down to rear of Cattle and Feed Alley below*; F *Fanning Mill, Bag-holder, &c.*; V, *Hay Shoot and Ventilator, adjoining which is* G, *Spout to run down Feed below*; L, *Ladder to Loft*; P P, *Posts*: S, *Space adjoining Shed.*

room. This cut feed is then placed in thin alternating layers with the pulped turnips. A car or large wheelbarrow is loaded with feed from the feed-room, and run out in front of the stalls.

The granaries are made mouse-tight. The number of bushels held by each is marked by figures on the back side of the bin, at a black perpendicular mark. Over the granary is storage.

The barn is vertically boarded, with boards a foot wide and 3-inch battens. The granaries or bins are lined with hard wood. The best way to exclude rats and mice is to pack a space with small fragments of tin—they will not work in it.

Sheep Barn at Michigan Agricultural College.

The sheep barn is 40 by 90 feet, and runs north and south. An alley 7 feet wide runs lengthwise through the centre—fig. 327. It has a good floor 2½ feet higher than the pens on each side. At each end of this alley is a sort of step-ladder to go to the hay-loft above. The joists over the

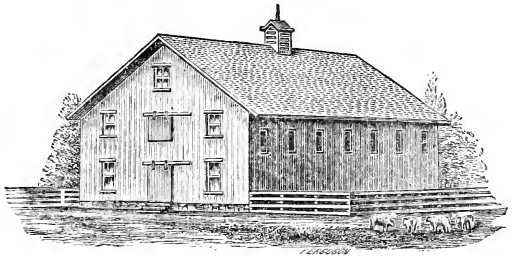


Fig. 326.—*Sheep Barn.*

alley are about 7 feet above it. At one corner of the chamber is a wool-room; and at the other a grain bin. The breadth given to the alley makes

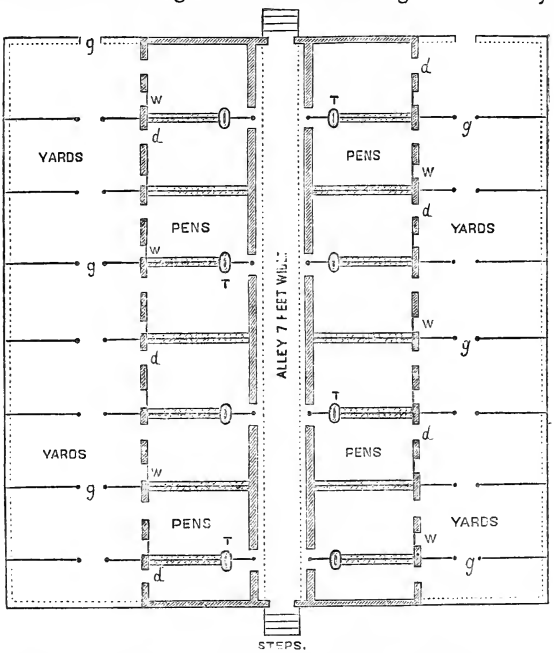


Fig. 327.—*Plan of Sheep Barn, flanked by Yards*—g g g, *Gates in Yards*; d d d, *Doors between Pens and Yards*; w w w, *Windows of Pens*; T T T, *Water Tanks.*

it convenient for feeding, and no hay gets on the sheep. In late spring this barn is found a convenient place for young calves.

The floor over the pens and alley is all on the same level. Doors are

placed in the sides of the building, opening into the loft, through which to pitch hay. The gates open for the admission of wagon and team for manure and other purposes.

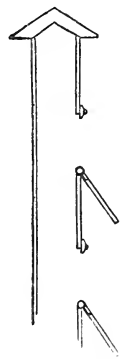


Fig. 328.—*Ventilator and hinged Doors, opening downward; buttoning up when closed.*

FURTHER DETAILS.—Each pen has a low door entering from the alley; and also a door running into the adjoining pen. The sheep-rack forms the boundary of the pens. Water is supplied to each pen from a pipe below ground, and which is pumped up by a windmill at some distance from the barn. The water is kept at a uniform level by means of a valve arranged in the reservoir. The back door passing into the yard from each pen is in two parts. The lower door is set in a groove at one edge, and is held to the other with a button. When not in use it is lifted out and set one side. The upper part of the door slides back on rollers above, and is on the outside of the barn. The upper one, when closed, permits a sheep to walk under it; or the lower one may be closed, and the upper open, when occupied by lambs. The pens are 12 by 16 feet, and the yards outside and adjoining are each 12 by 25 feet. The pens may be easily varied in width by moving the sheep-rack which divides them. To assist in readily supplying feed from the alley, a slanting board or door, *a*, fig. 329, inclines towards the alley, and on this the hay or grain is placed on its way to the feeding trough below. These slanting doors are 2½ feet high, and are held in place by long hooks, *b*, at the top. In the summer these doors are set up vertically against the studs, *c*, (which form the division between the pens and alley,) and are held there by buttons.

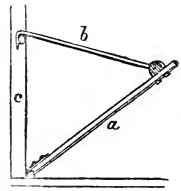


Fig. 329.—*Section of Slanting Doors.*

HORSE AND CARRIAGE BARN, BY PROF. G. T. FAIRCHILD.

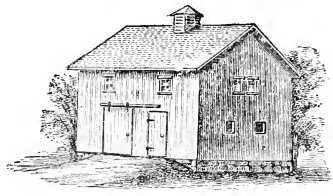


Fig. 330.—*Horse and Carriage Barn.*

Three were built on the college grounds at Lansing, Mich., according to this plan, with clap-boards and plain cornice, at $300 each above the foundation, and painted two coats—fig. 330. The plans nearly explain

themselves. The first floor (fig. 331) is 8 feet between joists. The trough below the floor, at the rear of the stalls, is for liquid manure. The granary under the stairs has three bins, with lids above for receiving the feed, and at the bottom for withdrawing it. The transom windows over the stable door are made of four 9 by 12 lights.

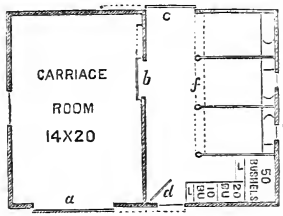


Fig. 331.—*First Floor*—20 *by* 28 *feet*—a, *Sliding Door*, 9 *feet wide*; b, *ditto*, 4 *feet wide*; c, *ditto*, 3½ *feet wide*; d, *Swing Door*, 3½ *feet*—e e. *Windows*, 1 *by* 2 *feet*; f, *Trough for Liquid Manure*; L L, *Lids to Grain Bins*.

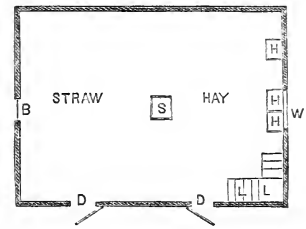


Fig. 332.—*Loft*—B. *Blind*; W, *Windows*; H H H. *Hay Shoots, extending one foot above floor*; L L, *Stairs and Lids to Grain Bins*; S, *Shoot for Straw and Ventilator*; D D, *Doors* 3½ *feet wide*.

The second story (fig. 332) is 6 feet from joists to plates. The blind is above the girt that joins the plates. *H H H*, are heavy shoots, extending one foot above the floor. The ventilator and shoots for straw have several openings at various heights, including one at the floor for cleaning the loft.

Eastburn Reeder's Barn, New-Hope, Pa.

This plan of a barn, measuring 50 by 80 feet, including the overshoot, appears to possess many conveniences. The accompanying plans of the basement and second story nearly explain themselves. It will be seen on examining the basement plan, (fig. 333,) that the root-cellar, being next to the embankment on the north wall, and flanked by other apartments, and by stables kept warm by the occupation of cattle, will not be liable to freeze in winter. The floor over it should be double, and the space filled with chaff. It is hardly necessary to state that the bank of earth should not press directly against the stone basement wall, as freezing and thawing would tend to throw it inward; but a space of a foot or more between the wall and earth should be filled with broken stone or gravel, with a good drainage at the base. This precaution will obviate the necessity for a separate wall a few feet from the cellar wall, to support the embankment; a short bridge spanning the intervening space, over which wagons are driven into the barn.

The entire space occupied by barn and yards (fig. 333) is 80 by 105 feet. The walls for the basement should be at least 8 feet high, and the posts from 16 to 20 feet in length. The double doors to the implement rooms and to the sheds, allow the ready passage of teams. The water may be supplied from a well, or from a cistern, and by a slight descent may

be supplied to all parts of the stables, pens and yards. The amount of water obtained from the barn and two sheds, with 3 feet annual rainfall, would be about 3,500 barrels, and would supply about 10 barrels daily all the year round; or if used only for half the year, during the driest portion, it would supply 20 barrels daily—all that the animals on the farm would

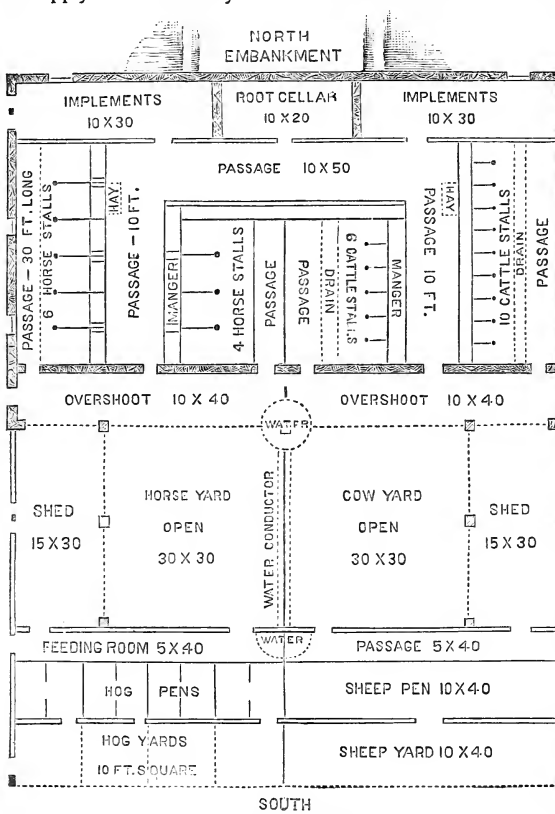


Fig 333.—*Basement.*

be likely to need. But the cistern should be quite large to hold this quantity. To contain only one-fourth the annual rainfall on the roofs, or 900 barrels, would require a cistern 20 feet in diameter and 12 feet deep, or with equal capacity in any other form. Farmers not usually appreciating the quantity of rain-water from the roofs of their buildings, do not often build their cisterns half large enough to hold it, and most of it is wasted.

The hog pens occupy a space 15 by 40 feet, which is divided into four pens, each 10 feet square, and four yards of the same dimensions. Each pen has a feeding and sleeping apartment, and will accommodate three or four hogs. The manure is thrown into the yards, and should be daily drawn or wheeled away to a compost heap, so that the air of the pens may be pure. as the animals thrive much better when perfect cleanliness is constantly maintained.

The sheep pen is 15 by 40 feet, with a yard 10 by 40 feet. It is large enough for 25 sheep. "The passage way," remarks Mr. Reeder, "in any

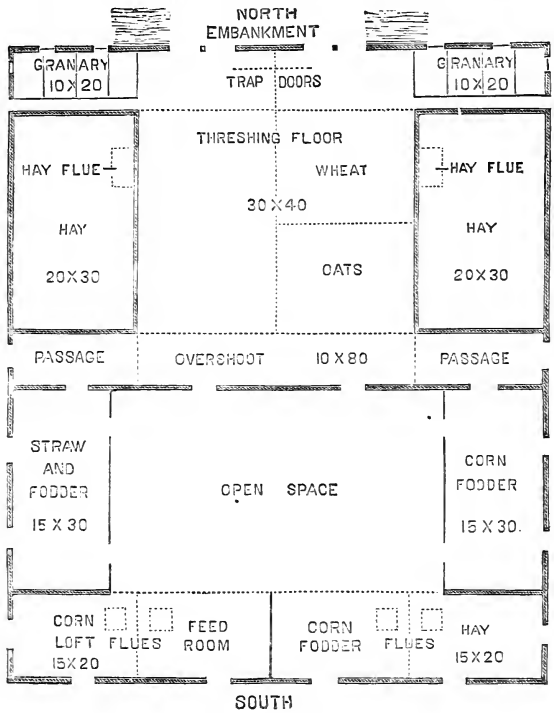


Fig. 334.—*Main Floor.*

plan which requires the teeder to go among the sheep, is objectionable." The partition separating the pen from the yard, is open slats and admits air and sun, as it opens to the south.

In the second story (fig. 334) the trap doors allow the dumping of the roots to the root cellar below. The hay flues, furnished with openings at

different heights in the hay-mows above, allow hay to fall into the 10-foot passages below, and in front of the entries. These flues should be planed smooth inside, and be a little larger downwards, to prevent the hay lodging in them. The doors outside from the granaries allow the ready filling of wagons below with the bags. The threshing floor may be filled with unthreshed grain as required—wheat on one side and oats on the other.

The straw houses (over the sheds) are 15 by 30 feet, with 10-foot posts, so that the peaks of these buildings come under the eaves of the barn. They shelter the yards from cold winds and storms, and do not prevent the sun shining in the yards from 9 o'clock in the morning till 3 o'clock in the afternoon.

Poultry houses and carriage houses are separate buildings.

James Wood's Barn.

This is a plan for a large dairy barn, 50 by 100 feet. The main floor (fig. 335) is planked all over, so as to drive loads of hay to any part of it,

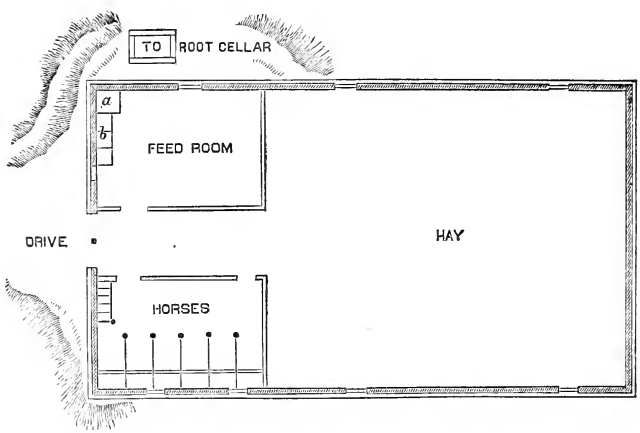


Fig. 335.—*Main Floor*—50 *by* 100 *feet*—a, *Ventilating Shaft*; b, *Feed Shoots to Basement.*

or thresh grain anywhere. In putting in the hay, the loads are driven to the further end from the entrance. There the mowing is begun with a horse-fork, and placed at a convenient width, and when this is carried up sufficiently high, another width is taken, and so on until the whole is completed. On a good floor the loads may be turned or backed with ease, as may be desired. There is no "barn floor," as it is commonly termed. This arrangement has great advantages for convenience.

For feeding the animals the hay is passed to the basement through the trap doors.

The basement (fig. 336) requires little explanation. The manure cellar is under the right hand end, and the manure is passed down from the stables through the trap doors. The cistern takes the water from the whole roof,

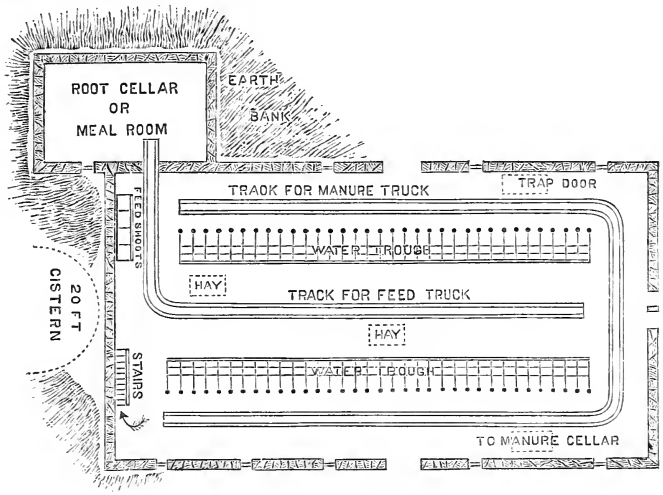


Fig. 336.—*Basement—50 by 100 feet.*

and from it pipes extend to the water troughs in front of the stalls and feed boxes. The cistern is some 20 feet in diameter, a size required to hold the water from the roof, and to supply the animals. A strong, durable timber floor, forming the floor of the entrance drive, covers it, and effectually excludes frost.

W. W. Dean's Barn.

The accompanying figures represent the leading characteristics of a barn 40 by 60 feet, with a bank on the north side, erected by W. W. Dean of Crawford County, Penn., for the accommodation of cattle, although the interior arrangements may be easily changed to a sheep barn or a grain barn, and a portion, if desired, appropriated to horses.

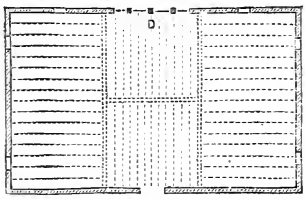


Fig. 337.—*Main Floor the dotted lines are Joists, the Floor occupying the whole Barn.*

Like the preceding design, a leading object is to omit all partitions and posts on the principal floor, so that a loaded wagon may be driven to any part when beginning to draw in hay. This floor is shown by fig. 337, the dotted lines indicating the position of the joists. The entrance doors are at *D*, and are shown in the elevation,

fig. 338. The mows are built up successively as wanted, the loaded wagon being driven to the most convenient spot for the use of the hay-fork. The large beams may be over the centre of the load, and entirely out of the way, so that there need be no pitching over them. The posts are 18 feet high, and these beams enter the posts just under the plates.

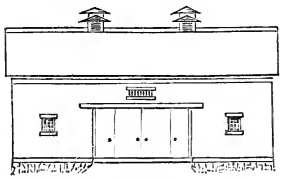


Fig. 338.—*Elevation—facing the North.*

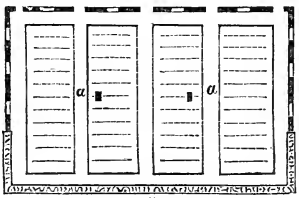


Fig. 339.—*Basement*—W, *North Wall*; a a, *Feeding Alleys.*

The basement is 9 feet high (fig. 339.) The barn faces the south, and the wall, *W*, is on the north side, from which side the loads are driven into the barn, as shown in the elevation—fig. 338. This basement is large enough for 48 cattle, the places for each stall being indicated in fig. 339; the heads of the animals may be towards the feeding alleys, *a a*, and the manure gutters and passages in their rear; or the position may be reversed and *a a*, may be the rear of the animals, as may be deemed most convenient.

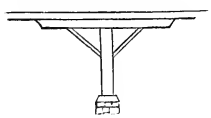


Fig. 340.

There are but two posts in the basement, the positions of which are marked in the plan. Additional strength is given to the sills which rest upon them by the timber cap, as shown in fig. 340. Similar braces to those shown are placed at right angles, to stiffen the cross-timber which receives the ends of the joists of the middle portion of the floor. The joists may be keyed for ties, as already described for Prof. Roberts' barn, to keep the sills from spreading.

There are four bents to the frame of this barn, those at the ends being made in the usual manner, and braced, as shown in fig. 341. The two middle bents are trussed, as represented by fig. 342, leaving free space for the entire floor.

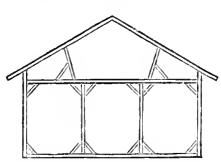


Fig. 341.—*End Bents—40 feet long; 18-foot Posts.*

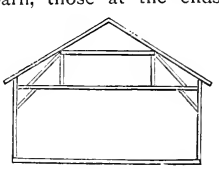


Fig. 342.—*Middle Bents—trussed.*

Mr. Dean informs us that a barn on this plan may be built with less and lighter timber than in the ordinary way, and that he finds it to possess much strength, the roof withstanding the heavy weight of snow the past winter (1877) without giving any at all, which is more than can be said of some other barns, framed in the old way.

At his suggestion the plans here given are slightly varied in some particulars from the barn as actually erected some years ago.

Octagonal Barns.

Barns of an octagonal form, or as nearly circular as will admit of easy construction, are now regarded with much favor by many intelligent agriculturists, and they possess several important advantages: 1 They enclose the greatest amount of space within a given surface of exterior wall. 2. They require fewer cross-ties or timbers, and the roof is partly self-supporting. 3. Shorter timbers may be used in building. 4. Loads may be driven to the centre and the horse-fork used to convey the contents to any side.

As but little attention comparatively has been given to plans and subdivisions of the interior or basement, it is not improbable that many improvements may yet be made. We give here, by way of illustrating the general principles of this kind of barn, the plans, with little variation, of a barn erected by E. W. Stewart of Erie County, N. Y., which he has kindly furnished, partly through another publication, with additional details especially for this article. The vignette, on page 229. which is varied from his elevation, shows the general appearance which such a barn may be made to present.

The following are the leading advantages given by Mr. Stewart, as compared with the common rectangular barn:

Our four rectangular barns covered about 7,000 square feet, while this octagon, 80 feet in diameter, encloses only 5,350 square feet, and yet has a capacity much greater than the four barns enclosing the larger area, because this has outside posts 28 feet high, while the others had only 16 to 20 foot posts. This octagon has an outside wall of 265 feet, while the other four barns had an aggregate of 716 feet of outside wall, showing the great economy of this form in expense of wall and siding. If we compare it with a single barn 50 by 108 feet, the latter will enclose the same number of square feet, and have the same capacity at the same height, but requires 51 feet more of outside wall. The rectangular barn will also require many more interior cross beams and posts, which are in the way, besides adding to the expense. The long rectangle requires, for convenience, two cross floors, which take up more room, and, being separated, are less convenient than the single floor through the centre of the octagon. The long barn requires posts and purlins to support the roof, which are obstructions in filling with hay and grain, while the octagonal roof of one-third pitch is self-supporting, resting only on the outside plates, and may be safely stretched over a diameter large enough to accommodate a farm of 1,000 acres, or say 150 feet in diameter. The plates perform the office of the bottom chord, and the hip rafters of the top chord, in a truss. The strain on the plates is an endwise pull, and if they are strong enough to stand the strain of the push at the foot of the rafters, the bottom of the

roof cannot spread, and the rafters being properly bridged from the middle to the top, cannot crush, and the whole roof must remain *rigidly* in place. Its external form being that of an octagonal cone, each side bears equally upon every other side, and it has great strength without any cross ties or beams, requiring no more material or labor than the ordinary roof. The plates are halved together at the corners, and the lips bolted together with four half-inch iron bolts (fig. 343); a brace 8 by 8 inches is fitted across the inside angle of the plate corner, with a three-fourths-inch iron bolt through each toe of the brace, and through the plate, with an iron plate along the face of the brace taking each bolt, the nut turning down upon this iron plate (fig. 344.) Now the hip rafter, 6 by 12 inches, is cut into the corner of the plate, with a shoulder striking this cross brace, the hip rafter being bolted with a three-quarter inch iron bolt through the plate into the corner post. A purlin rim, like the plate rim, of 8 by 10 inch timber, supports the intermediate rafters. If necessary in large roofs, the hips may be tied to the intermediates by long rods. The roof boards act as a strong tie to hold all together.

Fig. 343.

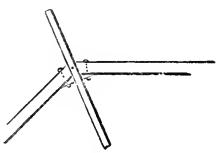


Fig. 344.

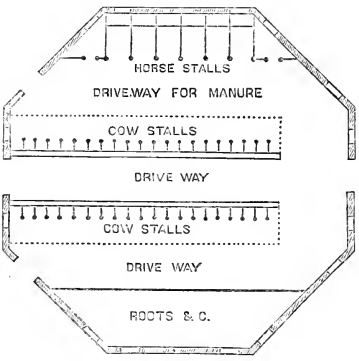


Fig. 345.

There is a drive-way 15 feet wide through the centre of the principal story from north to south (fig. 345.) There is a line of "big beams" on either side this drive-way, 13 feet high, across which a scaffold may be thrown to enable us to occupy the high space over this floor. The posts being 28 feet high, and roof rising 22 feet. the cupola floor is 50 feet above the drive-way floor below. The space above these "big beams" is quite clear of any obstruction, and a horse pitching fork may be run at pleasure to any part. The bay for hay on the left side of this floor is 80 feet long, and has an area of 2,030 square feet, and is capable of holding, when filled to the roof, 160 tons of hay. This bay, extending along the floor 80 feet, may be divided into as many parts as may be required for different qualities of hay, and each part be quite convenient for filling and taking out.

On the right hand side of the floor is a scaffold 8 feet high, having the

same area (2,030 square feet) for carriages, farm tools and machines below, and above this scaffold is—a height of 18 feet to the plates—a large space for grain, affording ample room for the separate storage of each kind, to the aggregate of 2,000 bushels or more. It will be seen that the large space in this barn is all reached and filled from one floor, saving much labor in changing from one floor to another. In our other buildings we had six places for hay, holding less than this one bay, requiring the moving of the horse-fork and tackle to six different bays, while in this bay the haying will begin and end, with room to spare.

The plans for the basement are not yet entirely perfected in all their details. The passage through it is from west to east, or at right angles to the drive-way on the floor above. The walls of the basement are not sunk below the surface of the earth, but an embankment is made on the north and south side up to the main floor, to admit ready access to the drive-way—not interfering with the passage from west to east through the basement.

One of the basement plans is shown nearly in fig. 345, and another in fig. 346. The plan shown in fig. 345, which is preferred on account of its cheapness and some conveniences, has 20 cattle stalls on each side of the 15-foot drive-way; and on each side of the horse-stalls is a triangular room for a cow with calf. On farms large enough to require it, a similar line of horse-stalls may be placed on the opposite side. It will be seen that a cart may be driven in and out at either of the three entrance doors. Fig. 346 shows the circular plan, with 52 cow-stalls, the heads towards the circular track for feeding, and the rear next the manure track. Horse-stalls may be placed near the centre, with heads outward towards the feeding track. Mr. Stewart informs us that this plan will be twice as expensive as the straight track, and on the whole less convenient. He further remarks:

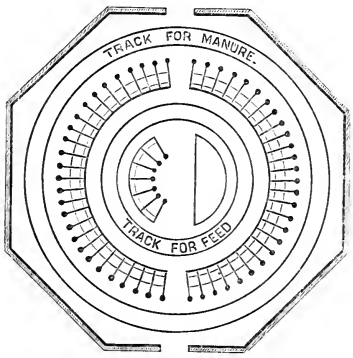


Fig. 346.

"I know some octagon barns that have a drive-way next to outside wall, but it is quite remarkable that any one should not see the great waste of room in taking off about 16 feet around the outside. Driving in a circle would require a wider floor. If you estimate the number of square feet of floor for such a drive-way, you will find about 3,900 square feet; while mine, 15 feet wide through the centre, occupies only 1,200 feet. Besides, the straight drive-way through the middle is the most convenient. And

you will see that the straight drive-way through the basement brings you in contact with the animals for feeding, and a drive-way behind for taking out manure. The basement may be laid out for four rows of animals, and leave room beside for calf-pens and lying-in stalls, &c. In that case it would require two driving or feeding floors.

"There is no doubt but the octagon is the most economical form, where the size is larger than is convenient to build with one length of timber, say 40 feet square. This form just suits the wants of all sized farms, giving capacity for 50 to 500 acres under one roof. I am extremely well pleased with it in practice. It is no small gain in economy of labor to have a self-supporting roof, and this form renders a self-supporting roof the cheapest. My barn stood some unusually strong gales of wind last fall and winter. It is, as you see, admirably adapted to stand wind and pressure of snow upon the roof. The eight sides render it out of the question for much snow to lodge on the roof, except near the plates, or where it is supported. The true circular barn is too expensive, and has really no economical points or conveniences not possessed by the octagon."

Three-Story Barns.

Before the introduction of the horse-fork, some of the best barns in the country were built three stories high, where sloping ground permitted the entrance to the upper story with a loaded wagon. Properly arranged and constructed, they still possess some important advantages, among which

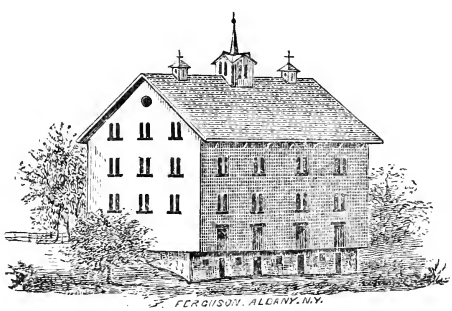


Fig 347.—*Cumberland County Barn.*

is the facility with which grain may be passed from the upper story to the lower during the successive operations of threshing, cleaning and bagging. In former volumes of Rural Affairs we have given in detail these arrangements.

Southeastern Pennsylvania is remarkable for its large and excellent farm barns, many of them of stone, and three stories high—similar to those figured and described on page 96 of vol. II of Rural Affairs, and also

on page 138 of vol. III, and page 319 of vol. V, with various modifications. But we do not remember to have seen such uniformly excellent barns as are a large number in this locality. Many of them are 40 or 50 feet wide and 70 feet long, while a few measured as large as 60 by 90 feet. They

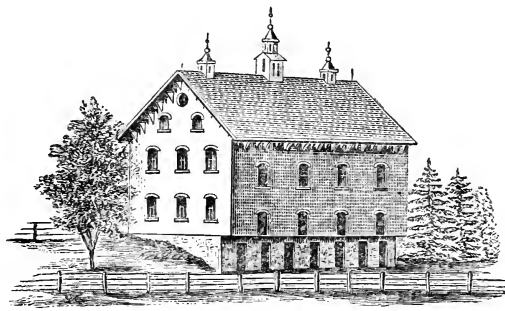


Fig. 348.—*A More Ornamental Barn.*

are variously built, of brick, stone and wood, and the best have handsomely slated roofs. They cost from $4,000 to $6,000 each, and some as much as $9,000. Fig. 347 is a representation of one of the larger ones, and fig. 348 one of more ornamental appearance.

THE FENCE FOR THE FARM.

AFTER CONSTRUCTING many miles of farm fences during a long series of years in farming, we find the kind here described the best, as combining cheapness, strength, durability and neatness. For strength it is superior to common board and rail fence, and is only equalled by the well known post-and-rail made by mortising the posts and inserting the rails. It is the most durable timber barrier we are acquainted with. Being on a straight line, it occupies but little land. It does not form so great a barrier against wind as a common board fence, and for this reason snow drifts do not accumulate under it to so great an extent. It is much cheaper in construction than either of the kinds we have named. It consists simply of good posts and common rails, which are secured to the posts with screw bolts and nuts.

We have set the posts more expeditiously and at less expense than by the common mode, by the process which we here describe. First, a long cord or garden line is stretched where the fence is to be placed. If the rails to be used are 12 feet long, a pole 11½ feet, or at least 11¼ feet long, is used for inserting pegs at each post-hole. The line is then removed, and the digging begins. But before commencing, procure a

board 6 or 7 feet long, and about a foot wide, cut as shown in fig. 349. At the middle, cut a half-circular opening large enough to receive half the post. At each end, and in a straight line with this opening, and at exactly equal distances from it, bore a hole with a small auger. Then on the other edge of the board make a small notch an inch in, and bore two other holes like the first mentioned, at equal distances from the notch, and in a straight line with it. Before beginning to dig the holes, lay this board on the ground, so that the peg (showing where the post is to stand) shall fit the small notch at the middle of the board, fig. 350. Then insert into the ground small pegs through the auger holes at the ends, which are in a line with it. Then remove the board and dig the post-holes, fig. 351. A number of holes may be dug in this way, taking care to leave undisturbed the peg on each side. The posts are then ready for setting. Fig. 351 shows the line for the fence at the dotted line, and the board, and pegs set by it at the right.

Fig. 349. *Board for Setting Posts.*

Fig. 350.

Round posts do well for this kind of fence, but any other shape may be used if they are all about the same thickness. To set them, place the

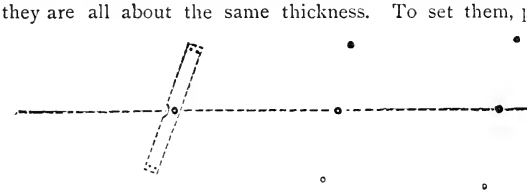


Fig. 351.—*Line of Fence and Places for Posts on it.*

board again on the two pegs, but in the holes on the other side, which are in a line with the large semi-circular opening (fig. 352). Set the post in this opening, and make it plumb, and it will be exactly where it is to stand (fig. 353). Throw in earth and pound it solid, taking care not to throw in more than an inch in depth at a time, in order that the whole may be beaten hard. When the hole is a

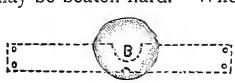


Fig. 352.

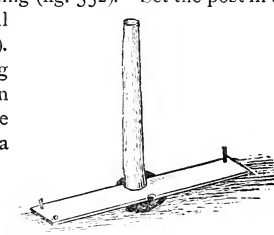


Fig. 353.—*Post Set in the Hole and Socket*

third full, the board may be laid aside and the filling completed. Posts set successively in this way, along the line previously marked out as already

described, will stand in a straight row, without the trouble of stretching lines to set them by, or of stopping to "range" each way to see if they stand in a row with the rest. As a consequence the work will go on more rapidly, they will be at uniform distances from each other, and laborers of ordinary ability will do as well as skilled workmen by the old way. We have set long lines of fence in this way with much satisfaction.

Fig. 354.

The same method may be adopted in setting flat-faced posts, in which case the central opening, instead of being semi-circular, has a flat side, as shown in fig. 354, the two auger holes being in a straight line with this face, and the board when laid on the the ground being placed carefully *in a line with the direction of the fence.*

The next thing is to screw on the rails, as shown in the completed fence in fig. 355. The screw-bolt, shown in fig. 356, is long enough to pass through the end of a rail on each side and through the post in the centre. The length will be governed somewhat by the size of the posts and rails, but as the ends of the rails are first

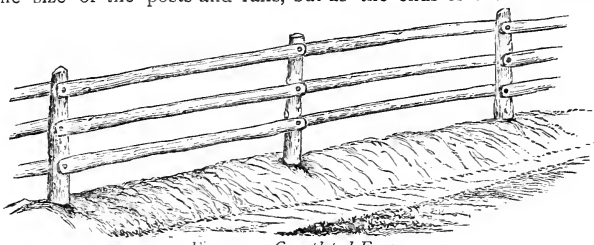


Fig. 355.—*Completed Fence.*

slightly flattened with an axe, their thickness may be partly made to correspond with the length of the bolt. We find those 10 inches long to answer a good purpose—9 inches might do well. If they are five-sixteenths of an inch in diameter, they will be strong enough, and will just fit a hole bored with an auger three-eighths of an inch. The boring is rapidly done with a brace-bit. The mode in which the rails are placed on opposite sides of the post is shown in figs. 357 and 358.

Fig. 356. *Screw Bolt.*

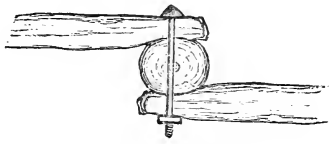


Fig. 357.—*Mode of Securing Rails.*

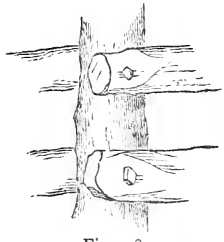


Fig. 358. *Rails Secured to Posts.*

The fence, when completed, should be about 4½ feet high, and unless small animals have the run of the farm, three rails, with a small ridge, will be sufficient. The top rail should be bolted on first, the hole being bored about 4½ feet high. The other two may be about 14 inches apart, which will leave a space below the bottom rail of about 20 inches. Two furrows plowed against the posts on each side, and the earth then thrown up with shovels, will nearly close this opening. The bank will stiffen the posts, so that they need not be set quite so deep; the ditch will assist the drainage, and the ditch and bank will serve an important purpose by preventing horses and colts from leaning and pressing against the rails, as they do not like the uneven surface of the ground.

If the rails are cut on purpose for such a fence, they may be about 14 feet long, and thus effect a slight saving in the number of posts, in the digging, and in bolts. The bolts are bought by the hundred at about $2.50, although we have sometimes purchased them at lower figures.

The whole fence made in the best manner, will cost much less than a dollar a rod; and if farmers already have a supply of common rails, the outlay will be quite small. In durability it exceeds any other timber fence, for if the posts are of durable wood, they will last, *with good drainage*, at least thirty years, and the rails much longer. The rails cannot be thrown off by the wind nor by any animal; the fence must stand till the posts rot. It does not need the common annual inspection and repair.

Farmers who now have common crooked rail fences of good sound rails, may use them for this purpose, and extend them more than three times

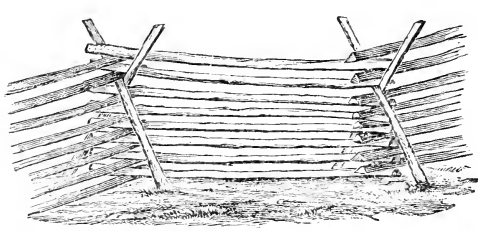
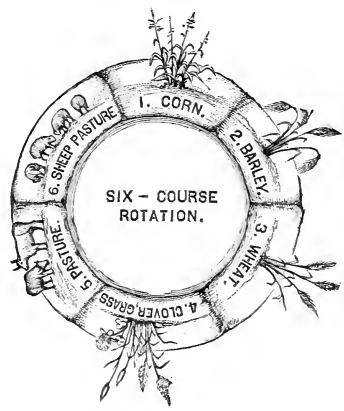


Fig. 359.—*Common Crooked Fence.*

the present length, as will be seen by inspecting fig. 359, showing by contrast the great number of rails as compared with fig. 355.

In one case, where a neighbor had a large herd of unruly horses, which would demolish any common barrier, we found that a single line of the new *barbed wire*, stretched 6 inches above the top rail, was a perfect defense against them.



ROTATION OF CROPS.

THERE ARE HARD AND EASY WAYS of doing farm work, to accomplish the same end. Destroying weeds by the broad sweep of the two-horse cultivator and harrow is easier than to cut them out with the hand-hoe or to pick them with the hand. An intelligent use of the thinking powers will often enable the farmer to do better work at less expense. This remark applies with force to securing the best rotation of crops. For assisting towards this end, we give one of the most economical and profitable systems of rotation, adapted to a large portion of the grain-growing regions of the Northern and Middle States.

The order of succession in the crops is the following : 1. Inverted clover and timothy sod for corn. 2. Barley. 3. Wheat. 4. Meadow. 5. Pasture, to be continued one or more years, or changed for meadow. This is well known as the most common rotation in many of the northern States, and the only peculiarities here pointed out are in the details.

1. THE CORN.—Excellent crops are obtained, as many cultivators are aware, by applying the manure the autumn previously on the grass, or even soon after the cutting of the previous crop of hay, when corn follows meadow. But as most of the manure made on the farm accumulates during winter, it answers nearly as good a purpose to draw it out and spread it as fast as made during winter, and this course saves much labor, by making but one removal or handling of the accumulations.

2. BARLEY.—It is important that the crop be sowed early in spring, and for this reason is adapted only to dry or well drained fields. On water-soaked land it would prove a failure. If the corn has been properly cultivated and kept clean, weeds will not have gained much hold, and if

previously weedy, the good cultivation will have tended to eradicate them. This end will also be assisted by the plowing, harrowing, and other stirring of the soil in spring, in preparing for the barley. Still further aid in this direction will be rendered by passing a smoothing harrow over the barley once or more, when from a few inches to 10 or 12 inches high, and the crop will be increased by this operation. The earliest variety of barley should be sown, in order that it may be harvested early, to admit several weeks of summer-fallowing before sowing the wheat.

3. WHEAT.—This being an important crop, proper care should be given to the preparation of the soil. The good treatment of previous years for other crops will extend to this also. The effects of the rotting sod for the corn, and the manure it received, will not yet have passed away. If the barley has been cut early, at least six weeks of summer-fallowing may precede the sowing of the wheat, at a time of year when it will accomplish much towards clearing out foul matter, as well as pulverizing the soil into the best condition for the reception of the seed. If the land is not strong enough, a light dressing of manure just before sowing will be of much benefit.

4 and 5. CLOVER AND GRASS.—Clover and timothy seed are sown early in spring on the wheat, or the timothy the preceding autumn. As soon as the wheat is cut, the young clover should have a dressing of gypsum, and again another the following spring. On lands benefited by it, it is the cheapest of all fertilizers as far as it goes. The grass should be meadow the first year, as it has not become strong enough for the tread of domestic animals. If continued another year or more as meadow, it should have a light top-dressing of manure applied in autumn, as the removal of the hay tends to reduce the land. Pasture is more favorable, having also the droppings of the animals. If continued several years for meadow, a year of pasturage should be occasionally interposed, the grass never being grazed short, especially on the approach of winter. Another important requisite in connection with seeding is to sow double or triple the usual quantity of grass seed, on an even, mellow surface. The increase in the amount of the crop will repay the additional cost of the seed many times over before the sod is again plowed under.

The essential elements of the preceding rotation may be retained, with a considerable modification of the details. A portion of the field devoted to corn may be occupied with potatoes, in which case, if the sod is strong, it may be plowed for this crop the previous autumn, and re-plowed in spring. Turnips, carrots, &c., may occupy the same field, care being taken to have the land properly prepared at the same time. Instead of barley the second year, may be peas, spring wheat, or oats, in which latter case it may be necessary to give an additional dressing of manure preceding the wheat. After the field is seeded to grass, it may be kept as meadow and pasture two, three, or more years, according to circumstances, and the number of fields occupied by the rotation.

For fewer fields, and where wheat is not successful or remunerative, a shorter rotation may be employed, commencing with corn, potatoes, &c., followed by barley, oats, &c., and then timothy and clover. If the crop is oats, it should be thinly seeded, or with about half the usual quantity, which will slightly diminish the oat crop, but be of great advantage to the clover.

THOROUGH CULTURE AND KILLING WEEDS.

By J. B. Jones, Lakeview Nurseries, Rochester, N. Y.

EVERY FARMER AND HORTICULTURIST feels the necessity of killing weeds and cultivating well; yet many do not know how, and others, through neglect, let the weeds get such a start that they find it impossible to keep them down. Most farms have been neglected so long, and have become so seeded with weeds and quack, that it is economy to begin with a summer-fallow, which is always to be avoided if possible, and is only excusable as a starting point toward good farming. But a fallow, to be of any use, except in its mechanical effect in disintegrating the soil, must first be plowed carefully, plowed completely, inverting every furrow, and leaving no skips or balks—as early in the spring as the ground is dry enough to work well, and if any quack be discovered, should be plowed only about four inches deep, and then harrowed with a sharp fine-

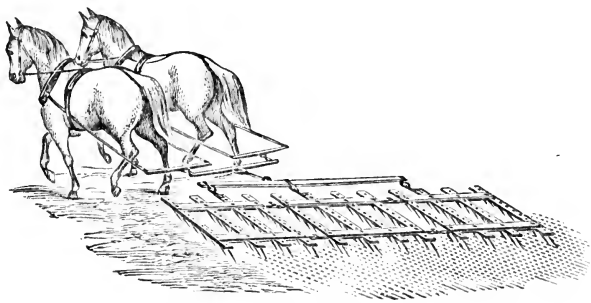


Fig. 361.—*Smoothing Harrow.*

toothed harrow until thoroughly pulverized, for which we find nothing equal to the Thomas Smoothing Harrow, made in Geneva, N. Y., (fig. 361.) After harrowing, go over the field every ten days with a two-horse wheel cultivator until July, when it should be cross-plowed, no deeper than at first plowing, and the cultivating repeated every ten days until not a spear of living quack or other foul plant is to be seen.

If it be dry land, and not a wet season, this can be done in time to sow

wheat; but if through neglect to repeat the cultivation regularly, or a wet season or damp soil should prevent killing the weeds or grass completely, continue the cultivation till winter is rapidly approaching, when plow as deep as you wish, and leave rough till spring; then sow with the expectation of having a good crop, free from weeds. We have repeatedly taken a heavy quack sod or thistle field, and so thoroughly killed every root that for years after not a plant could be seen. With such a start, followed by a heavy seeding of clover, plowed up the second year and planted to corn or potatoes, worked with a smoothing harrow until the rows can be seen, then cultivated thoroughly and carefully, nearly all hand-hoeing can be dispensed with, and the crop kept as clean as a garden. This may be succeeded by a crop of barley or oats the next spring, and plowed the moment the grain is off, cultivated until wheat is sowed, and again seeded. This will insure clean land, with very little labor, for all time, but the fence corners and roadsides must be looked after, with the determination to let *no weeds go to seed, and to kill all young ones while coming through the surface of the ground.*

Slipshod farming is never profitable, as it necessitates frequent fallowing, which is always expensive in labor, as well as exhaustive to the hand, besides the entire loss of the field for one season, with greater loss of fertility than would grow a good crop for the same time.

In these days of new inventions, and improvements on old ones, a farmer must experiment with a great number of new tools, retaining those that are desirable and rejecting those that are not; but let no one be induced by smooth-talking salesmen to sign for any tool whatever until tried and proved to be a superior article.

We have been experimenting some years with new tools, and have succeeded in supplying ourselves with several aids toward a more thorough cultivation of all hoed crops, seedlings, nursery trees, &c. In our strong clay soils we find that pulverizing the subsoil is decidedly profitable for all root crops, seedlings and trees, where grown on well drained soil; but all the plows made for that purpose were too heavy for general use until about two years ago we first used Miner's subsoil plow, manufactured by R. H. Allen & Co., New-York. This is so shaped as to enter the ground very easily, raising and pulverizing the subsoil, and yet so light as to be easily handled by a half-grown boy, and drawn by one heavy, steady horse. With this we follow the two-horse plow in fitting land for root crops and for trees, working with the two plows about 10 inches deep, and during summer keep the "Miner's subsoil" running twice in a row between the rows, when planted 3 feet apart, and once in a row among seedlings and root crops—such as beets, carrots, turnips, &c., which we usually plant 18 to 20 inches apart. This keeps the land from getting hard, as well as loosens the surface, so that weeds cannot start. There have been some objections made by observers to disturbing the roots of growing plants and trees, but our experience is that wherever so treated both plants and trees

do very much better, and we have come to the conclusion that so many roots run along the rows and downward that the plow does not hit them. What few roots are cut off soon form new rootlets, and the growth is not checked; while the deep pulverization is of great benefit the season through.

With a plow that will scour in all soils and conditions of soils, we are enabled, by planting all rows perfectly straight, to run a one-horse plow within two inches of a row of trees, throwing a light furrow away from it, and by returning on the other side of the same row, the 4 or 5 inches of soil in the row will be pushed over, leaving a sharp ridge, with no place for weeds to start (fig. 362.) We have never seen a plow, not even cast-steel, that would scour in a soft pulverized clay, except the chilled iron plows. The one we use is made at Albion, Mich., by the Gale Manufacturing Co. These plows are so hard that they do not seem to wear at all; a file will not touch them, neither will rust corrode them, and they always scour.

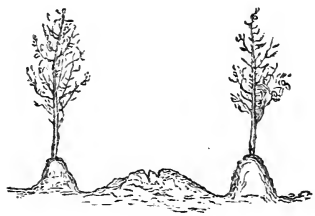


Fig. 362.

The two furrows thrown away from rows form a ridge in the centre, covering and destroying all weeds. After about ten days run the plow twice through the rows again, throwing the earth toward the rows, making a clean furrow in the centre, and again destroying all weeds (fig. 363.) We then follow with the subsoil plow in this centre furrow, turning the handles at an angle of about 258 towards the right hand row of trees, which will

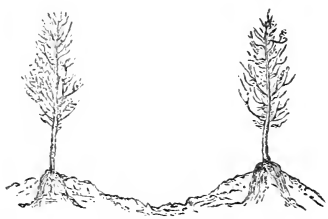


Fig. 363.

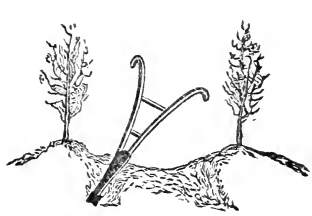


Fig. 364.

run the point and sole of the plow as near the left hand row of trees as is advisable (fig. 364)—returning in the same way, which will tear up and loosen 15 to 18 inches of the 3½ feet between the rows, to a depth of 10 to 12 inches. Again in ten days take one of the best cultivators of the day and pass as close to the right hand row as the cultivator can be run and not scrape the trees, which will be about 2 inches if the man holding the cultivator is very careful, and keeps his mind on his work and his hands firmly grasping *both* handles. This will require him to work with the lines around the small of his back, just of the right length, so that he can check

the gait of his horse to a steady walk, or turn him to or from the row by a slight turn of the body, without letting go of the handles. Any smart, willing boy of sixteen, who is handy with horses, can be taught in half a dozen lessons of a quarter of an hour each, to do better work of this kind than an old teamster will usually do, and is far more easily taught to do as he is told. Such thorough and careful cultivation will lessen the hand labor of all hoed crops. If any weeds are left, we pull them out by hand when they get large enough; but so few are left that a boy will go over two acres per day, and not leave a weed.

We find that we can keep thoroughly cultivated and free from weeds the season through, about 20 acres per man, while under the old practice it required one man to 10 acres to do the same work in our nursery—which, in these times, is a material item.

We have adopted the same course of close culture with our farm hoed crops; but we have to start with straight rows and use Perry's Scarifier, with roller low when we stop using the smoothing harrow, and as the plants get larger, we first use the cultivator, with Miner's Subsoil alternately; then the one-horse plow, throwing a shallow furrow from the rows, finishing with the cultivator, weighted to run deep—insuring a mellow soil to the depth of 8 inches, with no more thistles or weeds that season. If the crop is potatoes, however, we finish with a winged cultivator, which we also use in the fall between the rows of our nursery trees, leaving a clean furrow between the rows for the water to run in, and the trees well protected from mice and the weather.

We find the use of the scarifier and subsoil plow in berry plantations very desirable in dry seasons, it being fully equal to mulching the surface, and prevents weeds growing; while the mulching, unless very thick, increases weeds. We only place straw close to the plants to keep the berries clean, and cultivate the rest of the space deeply. Among raspberries we work a plow, throwing the furrow alternately to and from the rows, with an occasional cultivating to break the lumps; and among blackberries we work thoroughly early in spring; then let the weeds grow, keeping them from seeding by mowing often. We find that if we cultivate our blackberries during the summer, they are more liable to be killed by the winter.

OYSTER-SHELL BARK-LOUSE.—The Agriculturist furnishes the following results of an experiment in destroying this insect on the bark of the apple tree: Crude petroleum was applied in February, by means of a broom, to the trunk and branches wherever infested. In the spring the trees started with renewed vigor, and made a fine growth that season, the bark-lice having disappeared, and the bark was smooth and healthy. The work must be done in winter, and we think the oil sparingly applied. Another correspondent uses common whitewash made from fresh lime. In this case we suggest making the wash quite thin, so as not to form a thick coat of lime.

FARM BOOK-KEEPING.

By Newton Reed, Amenia Union, Duchess Co., N. Y.*

IT CANNOT be said that an exact statement of the business of the farm is essential to success, for everywhere it is evident that practical men, both the intelligent and ignorant, conduct their business with reasonable results, who cannot give an intelligent account of it in figures. They know, by years of experience, that good farming is profitable, and by well trained practical observation, they are able to decide as to the kind and method of farming which it is best for them to follow. They feel their way cautiously, all along, by trial, and without many mistakes. They are not negligent of their accounts with other people, which are readily adjusted without any detriment to either party.

And yet it is almost incredible that so few farmers are able to give, in trustworthy figures, the income and expenses of their farms, so as to show the exact profit. Men of excellent sense and long experience differ very widely in their statement of the actual value of the business of farming. If they could give the figures from a record of several years, their judgment would have a positive foundation, which would be satisfactory and valuable to themselves, and would also enable them to give to others an opinion which would carry conviction. All sensible inquirers yield to the authority of a careful record. Statistics settle questions beyond dispute.

It is some discredit to the intelligence of farmers that it is so often a question whether farming pays, and whether an investment in farm lands brings an income of three per cent. or ten per cent.

The farmer who has before him an exact record of the operations of ten or twenty years, has learned the value of his land, and has gained a wholesome confidence in his business, which makes him progressive, and sets him upon valuable improvements with energy. Such a record is a safe guide; the maker of it consults it often himself, correcting or

*In connection with these practical and lucid directions for keeping farm accounts, we take the liberty to insert the following extract from a private letter previously received from Mr. Reed, containing some introductory remarks:

"The first item of advice which I give to young farmers, is to keep exact accounts. But I have been disappointed in not being able to induce them all to continue the practice. They are apt to begin with the notion that it is an elaborate thing, and that it requires considerable technical knowledge and clerical skill. The notion is strengthened, rather than removed, by the books which have been prepared for the use of farmers in their farm accounts. They not only propose too much, but they mix those things which must be kept entirely separated.

"Is it not remarkable that intelligent, practical and successful farmers should differ as to whether their business gives them a net of four per cent. or eight per cent.? And when the question is asked outside, whether 'farming pays,' very few farmers are able to settle the question instantly by the undisputed authority of figures. I know, from my own experience, that it is a simple and easy thing to keep accounts that will show the value of the business, the expenses of the household, and everything that is connected with the finances of the manager. Such a record becomes in a few years a valuable guide to the maker of it, and to those who come after him."

stimulating his work by it, and it will be very useful to those who come after him.

Those who understand the value of farm accounts are surprised at the general neglect of them by farmers. The principal reason of this neglect is from a misapprehension of the difficulties of the work. To the uniniti. ated, book-keeping seems like a dark science, and only suited to commercial transactions. And in our agricultural journals, which earnestly and properly insist on the importance of exact farm accounts, the plans suggested are usually too complicated, and those who enter upon them get puzzled, and give it up. The books also which are prepared for farm records are usually exposed to the same objection. They overdo. Very few of those who have attempted the use of these books continue to make a satisfactory use of them. The farmer must have a very simple book. It is scarcely necessary to say that a large proportion of farmers have not the clerical qualifications for conducting any elaborate system of book-keeping. Happily such a system is not necessary. The farmer's book-keeping may be so simple as to be beneath the criticism of the professional clerk, and yet answer its purpose completely.

The first and most important question answered by a correct farm account is, what is the profitable income of the farm? This is answered by finding the difference between the whole income and the expenses, and the simplest way to find this is the best way. It is not practicable to open an account with each particular field or crop, or with every animal or kind of stock on the farm, as some fanciful theorists have advised. The expenses of working different fields, and of feeding different kinds of stock so run into each other, that an attempt to keep a record in that way would end in confusion.

FAMILY EXPENSES.—The farm expenses should be separated from the family expenses, and from all others. By not observing this rule, the widest discrepancies appear in the statement of the farmer's business. The farmer should know well what the expenses of his family are, but he should not let them be confounded with the expenses of the farm. It is this confusion of accounts which has led so many farmers to undervalue the profits of their business, and left them in inexcusable ignorance of the usual expenses of a family.*

THE INCOME OF THE FARM arises from what is sold, or what is used for the family. The record of income does not take notice of all that is produced on the farm. The hay and grain fed to the stock appear in the returns of the dairy, or in the beef and pork. Grain sowed or fed is not counted in the income. But the provisions raised on the farm and used for the family—grain, meat, milk, butter, eggs, chickens, vegetables and fruit—are as much a part of the income of the farm as anything sold from it. They may constitute a principal part of the income when the farmer's

* If the members of a rural community should inform themselves of the cost of supporting a family, it would correct their notions of what is a reasonable salary for professional men.

family is large, or his farm small. There can be no true statement of the value of the farm products if these are not counted, and the exact figures which exhibit this part of the farmer's income will surprise some of the most careful observers. Besides these, any addition to the value of the stock produced on the farm is a part of the income. Also any permanent improvements produced by the ordinary labor of farm hands and teams.

THE EXPENSES OF THE FARM are labor, repairs, taxes, stock purchased, feed purchased, seed and fertilizers purchased, decrease in value of stock (if any), board of laborers, and insurance. That is all.

Insurance will probably not appear every year. *Decrease* in value of stock may not appear every year. It may be *increase* in value, and will then appear in the column of income. To ascertain this, and for other reasons, an inventory of the stock is taken at the end of the year. The board of farm laborers is clearly one of the farm expenses, and should be properly noted and separated from the account of family expenses.

Interest on the value of the farm and stock is not a part of the annual expense of the farm, but it will naturally enough be compared with the net income. Neither is the interest on any debt which may be due for the farm or stock. The salary of the manager, if he is the owner, is not a part of the expenses. His salary is in the net income.

Necessary repairs of buildings and implements is expense, but any entirely new building, in addition to what was, and any other improvements of the farm, is not expense, and if these improvements are made by the farm labor in part, so much of the cost of them must appear in the account. As it is a valuable addition to the farm, it is so much increase of capital, and so much of it therefore as appears in the account of labor may be put in the column of income, as will be shown by example. And it is proper to say that all these suggestions are from the teachings of experience, and we are at liberty to take our illustrations from actual accounts:

INCOME AND EXPENSES OF THE FARM.

Sheep sold,	$176 29	Farm labor,	$1,011.13
Wool,	116.95	Repairs,	224.38
Wheat,	513.61	Extra labor,	210.00
Corn,	5.00	Seed purchased,	73.48
Pork,	185.40	Taxes,	123.76
Beef and Cattle,	329.43	Stock purchased,	520.00
Milk,	2,656.87	Board of men,	240.00
Butter,	252.00	Plaster, fertilizer,	36.00
Veal,	53 20		$2,438.75
Hay sold,	68 70		
Wood sold,	21.00		
Apples,	35.00		
Potatoes,	60.00		
Poultry,	75.00		
Rent of tenant house,	50.00		
Improvements,	250 00		
Increase of stock,	130 00	Net income,	2,539.70
	$4,978.45		$4,978.45

This example is taken because it presents nearly all the variety of accounts. The income includes what was sold and was used in the family.

The corn raised was all fed to the stock except $5 worth used in the family. The hay and wood sold includes that to the tenant, which, with rent, is part of his wages. The permanent improvements were in conducting a spring of water to the barn, and the exact cost is put down, and not the value. The cost of it appears in the farm labor and extra labor, and and as it is not an annual expense, but a valuable investment, it must appear in the income column. If it should appear only in the expense column, it would show money out of pocket.*

Farm labor and extra labor is increased by the permanent improvements in the other column.

The repairs include farm tools, horse-shoeing, &c.

No part of family expenses is here. The board of farm-hands is a farm expense, and as it adds so much to the cost of the household, it should appear, either being deducted from the sum of the family expenses, or added to the income of the household, as if the farmer paid his wife so much, say $240, for boarding his men, which would be a handsome way of putting it.

The example given on page 265 is of the character of a ledger.

THE DAY-BOOK, or daily memorandum, out of which this ledger is posted, may be kept for the farm by itself, or the farm accounts may be kept in the same book with other accounts, where a record is made in diary form, as simple as possible, of the farm expenses and receipts, the family expenses, and any other expenses and receipts. Out of this is compiled or posted each item into its own column, the farm accounts into the farm ledger, and the others into their proper place. This method is prefered for the few accounts which a farmer has. One page of foolscap will hold all the figures of a year's account, and the posting can be done in two or three hours at the end of the year.

Sept. 3.—	Received of S—— T——, for Seed Wheat,	$15.00
4.—	Received for Calf,	7.50
	Paid for Grass Seed, 3 bush.,	10.50
	J—— B——, Dr. to Seed Wheat, 12 bush., $2,	24.00
	Paid W—— S—— for Coffee, $3 50; Coat, $7,	10 50
15.—	Received for Milk (for Aug.),	195.08
	Paid S—— T——, for mending Wagon,	2.87
Dec. 11.—	Beef for family, 216 lbs; 9c.,	19.34
	T—— R——, Dr. to ¼ Beef, 220 lbs.; 9c., (paid,)	19.80
	Received of J. C. & Co., for Beef,	34.60
	Received for Hide,	4.50
20.—	Paid for Cultivator & Country Gentleman,	2.00
	Paid for Evening Post (by check),	3.00
	Paid for Postage Stamps,	3.00
26.—	Paid W. & Co in full (Provisions, $17; Cloth, &c.,)	41.00
31.—	Paid Pat in full for 8 months,	160.00

This example is to show the manner of keeping the Day-Book. There are eight items of income of the farm, two for wheat, two of the dairy, four for beef. There are three items of expenses on the farm—seed, repairs and labor. There are six items of family expenses, provisions, cloth and

* These repetitions may seem to a book-keeper unnecessary, but this paper is prepared for those unacquainted with accounts.

literary—the last being for the COUNTRY GENTLEMAN, Evening Post and postage stamps.

These several items are posted, as already directed.

It is not essential that all this particular classificatfon be observed, but it is positively essential that the farm accounts and the family accounts should be separate.

In the book which serves us for these illustrations 18 pages quarto, 21 lines on a page, contain all the items which are posted into the example on page 266, and also the items of all the other business for the farm and family for a year.

It is well to have a memorandum book for the running accounts of the hired men and women, each one on a separate page, which can be balanced at a glance. This will leave the day-book relieved of many small items, and will put those accounts in a convenient form for ready adjustment, which is desirable.

By this simple arrangement the farmer will know at the end of each year what is the profit of his business, and what are all his expenses. These are the things which it is desirable to know for himself, and which he should be able to show.

There are other things of great value to the farmer and his family that come to them from the farm and its management, which are not in this exhibit, and which are indeed some of the most valuable things that a family can have, and would be costly to purchase or to hire.

The Rent of the House is worth to them as much as they would have to pay for the rent of one suitable to their circumstances.

Necessary Fuel which the farm affords is a part of the valuable income of the farm. So are the products of the garden.

Horses and Carriages, which are used for the convenience and pleasure of the family, are a part of the investment of the business, add to its cost, and are a valuable part of the farmer's profits.

All these are properly estimated by those who wish to compare the profits of the farm with the profits of other investments. There is yet another item of profit on every well conducted farm—

Increase in Productive Value.—There is, in every farm which is conducted as it should be, an increase in productiveness. It is so much addition to the capital, and the most valuable addition that can be made, the surest increase of the farmer's wealth.

Besides the day-book and its ledger-page in it (and the small memorandum), which contain all the figures of profit and loss, the observing and progressive farmer will keep a Book of Notes of various things connected with the farm and its surroundings—the weather, the progress of the season, the date of the arrival of birds, the time of doing any work on the farm, the careful details of any experiments made, the details and cost of any building or repairs, or other improvements, a record of the crops, bushels of grain raised, and tons of hay harvested, in exact figures when

practicable, and if otherwise, estimated as nearly as possible. This book is not necessary to the account of income and expense. The farmer may know his exact profits without it, but it is evident enough what a valuable record he will have in this after a few years. He may make these notes more or less extended, according to his taste, or to the leisure he may have. If he is observing and careful, he will, after a few years, have a collection of statistics of the farm which will be of positive use to every practical farmer, as well as a collection of observations which will add to general knowledge.

From this book he can show the average products of crops, and the proximate cost, the quantity of hay stored, the comparative proceeds of land in grass, and land in grain crops, the comparison between cattle and sheep, the cost of keeping cows and the income of the dairy, and most profitable branches of dairying. A compilation from these notes will enable the farmer to answer all those questions which are so often asked without any satisfactory solution, and they will help to correct a great many mistakes.

FARMING ON SHARES requires a method of its own, in keeping the accounts between the proprietor and the tenant. The book should be kept by one or the other in his own name, and not as a partnership. The pecuniary relation of the two parties sometimes becomes perplexed, and difficult to settle, when the book is kept in the name of both parties.

It is generally better that the book be kept by the tenant, who is always on the ground, and manages a greater number of sales and purchases. All his dealings with others, except the owner of the farm, are accounted in the same manner as the accounts of other farmers are kept.

There are three methods or conditions of farming on shares. First—when the owner furnishes all the stock and tools, and pays the taxes, pays for the grass seeds and commercial manures, and has two-thirds of the products of the farm. This is on the theory that one-third of the products is sufficient to pay for the labor on the farm, which is correct if the farm is a good one. Second—when the tenant owns the stock and tools, and pays for the seeds and manures and taxes, and has two-thirds of the products. Third—when half of the stock belongs to the owner, and half to the farmer, and the product is equally divided. The theory in these three conditions is, that one-third of the products of the farm pays the interest on its value; one-third pays for the labor, and one-third pays the interest on the cost of the stock and tools, the depreciation in the value of the stock and tools, and the taxes, insurance and repairs. In all the conditions the grain used for seed or for feeding is taken out of the common stock, which is the same as each party furnishing his portion of the grain. If any feed is purchased, each party pays his proportion. The farmer generally has the rent of a house, and other things, according to agreement.

The account between the parties is most conveniently kept in a book by

itself. The farmer (if he keeps the account) gives credit, or makes a charge, for every item between them, on separate pages.

1876.	JAMES, Proprietor.	CR.
April 1.—Cash for Oxen, &c., (by check.)		$500.00
14.—Cash by Brown, for Hay, 3 tons, $42,	(half,)	21.00
Calves sold to butcher, $26	do.	13.00
28.—Calf sold to butcher, $14	do.	7.00
Butter used in my family, 28 lbs.,	do.	3 50
Butter to himself, 20 lbs., 25c.,	do.	2.50
		$547.00
Dec. 8.—Beef for my family, 280 lbs., at 8c., $22.40,	(half,)	$11.20
Beef to himself, 130 lbs., $10 40	do.	5.20
Cash for Beef sold to Brown, 200 lbs., $16,	do.	8.00
Hide sold for $3.60.	do.	1.80
Cash for Wheat sold at the mill, 160 bush., $280,	do.	140.00
		$166.20

In the account book the following should face the above on the opposite page, or the opposite division of the page:

1876.	JAMES, Proprietor.	DR.
April 1.—Cash paid T. Smith for Oxen, $180,	(half,)	$90.00
Cash paid for 6 cows, 300	do.	150 00
20.—Cash paid for Bran. 2 tons, 50	do.	25.00
25.—Cash paid J. Jones by his order,		12.00
Cash paid to himself,		40.00
30.—Cash paid Mills for Horse, $120.	(half,)	60.00
Cash freight on Horse as agreed,		3.00
Butter to himself, 20 lbs., at 25c.,		5.00
Cash to balance,		162 00
		$547.00
Dec. 8.—Beef to himself, 130 lbs., at 8c,		$10.40
20.—Wheat put into his granary, 25 bush., $1.75,		43.75
Cash,		100.00
31.—Cash to balance,		12.05
		$166.20

The proprietor is charged $90, his half of the $180 paid for a yoke of oxen. So of the other stock. The whole cost should be stated, and the half indicated.

April 30, the proprietor is charged $5 for 20 pounds of butter, and on the Cr. page he is credited with $2.50, which is his half. So also December 8th the beef delivered to the proprietor is charged to him, 130 pounds at 8c., $10.40. Then his half of its value is put to his credit, $5.20.

So also the proprietor has credit for one-half of the beef which the farmer puts to his own use.

By this method the account between the two parties is clear, and can be balanced at any time. At the end of April the balance due to the proprietor, who seems to furnish the capital, is $162, and at the end of December, $12.05, which is paid or allowed to stand, as agreed. It is decidedly best that the balance should be found *often*—every month if the proprietor

is at hand; at least two or four times a year. It requires but a few minutes of time, and often would save endless perplexity. This is in accordance with the teaching of long experience in the books to which we have been permitted to refer.

If it is more convenient, the proprietor may keep the account, in his own name, and give to the farmer Dr. and Cr. in a similar manner, which is much better than to keep the account as of a partnership.

If all the transactions between the two parties are considered cash transactions, and each party receives his part of the income at the time in cash, or pays his part of the expenses at the time in cash, there would be no place for error. If the account is treated as such, the party who keeps the account is to pay over to the other his portion when he receives it, or otherwise he treats it as so much money borrowed, for which he gives the party credit.

It is not necessary that the young farmer should adopt at first all the parts of the system proposed here. The essential required is to find and to show the actual income of the farm; the profits of his business. If he enlarges his work, by a record of experiments made, and by notes of his observations, he will find his work not only of practical value to himself and others, but also of much pleasure.

NOTES ON ORNAMENTAL PLANTS.

A FEW RANDOM NOTES on some of the most desirable hardy ornamental plants may prove of interest to the readers of the ILLUSTRATED ANNUAL REGISTER OF RURAL AFFAIRS, and assist in their more general introduction. For the cuts accompanying these notes we are indebted to James Vick of Rochester, N. Y., so well known for his successful labors in promoting the culture of ornamental plants in this country.

There are many species of the SILENE, a few of which are highly ornamental. *S. Pennsylvanica* is a brilliant scarlet; *S. regia*, larger and richer in color; *S. armeria* (fig. 365) is an erect annual, growing a foot or more high. The flowers are in dense terminal cymes; one variety bright rosy carmine, others duller in color. It has a handsome appearance when grown in tufts or masses. The stem, like some other species, is viscid, hence the name catchfly often given to them. The two species first named are perennial; this is annual.

Fig. 365.—*S. armeria.*

THE GENUS MIMULUS.—This genus embraces a number of ornamental plants, the flowers of which are beautifully marked or variegated, (fig. 366.) There are about thirty species, found in North and South America, and in Australia. They are well adapted to baskets under verandas. They are mostly perennials.

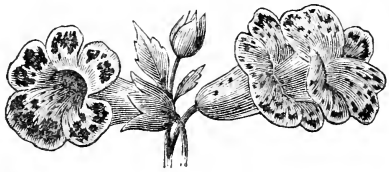


Fig. 366.—*Mimulus.*

ASTILBE BARBATA (fig. 367), commonly known under the name of *Spiræa japonica*, is one of our handsome herbaceous perennials, bearing a profusion of white flowers, and resembling several of the Spiræas. It is remarkably successful as a house plant for winter blooming. It is becoming widely introduced into gardens.

Fig. 367.—*Astilbe barbata.*

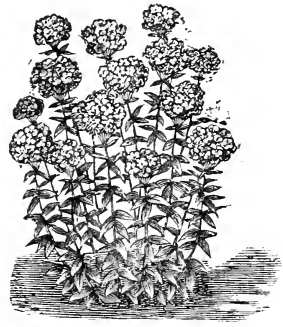


Fig. 368.—*Perennial Phloxes.*

PERRENNIAL PHLOXES (fig. 368.)—These are among the best known and most widely cultivated of our perennial ornamentals. Many varieties have been obtained by cultivation. Vick says: "The flowers, when plants get strong, are immense bunches of bloom, from the purest white to crimson. Plants will keep increasing in size, and may be divided at the roots every year or two. Half-a-dozen well established plants, and of well selected colors, are a treasure for the garden that every lover of flowers must appreciate. The Perennial Phlox is one of those hardy, useful and beautiful flowers whose culture we are anxious to increase, because the expense and trouble are but little, and the result more than satisfactory. The flower resembles that of the annual Phlox, but the clusters are large, sometimes forming majestic heads of bloom. When in flower it is two feet or more in height."

TRUMPET CREEPER, (*Bignonia radicans* of old botanists,) fig. 369, is one of the best hardy climbers, where a profuse clothing of verdure

is desired for a brick or stone building or wall. The deep orange-red flowers late in summer are a handsome ornament. The plant supports itself on the wall by rootlets from the joints. It is often seen, but is worthy of more general introduction.

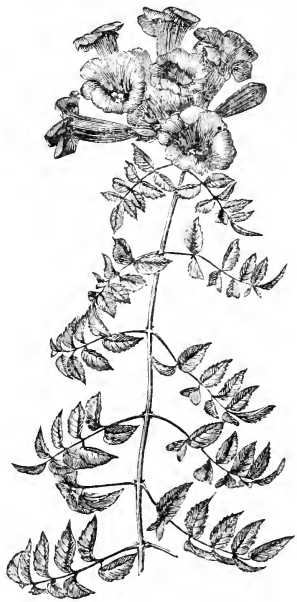


Fig. 369.—*Trumpet Creeper.*

THE IRIS, (fig. 370,)—Is a well-known genus, very numerous in species, and embracing many beautiful and showy herbaceous perennials. Vick remarks: "They are natives of damp spots in all four quarters of the globe, but were adopted for garden culture more than

Fig. 370.—*Iris.*

three hundred years ago. In that time they have become very much improved, and some species and varieties are exceedingly beautiful. *I. Susiana major* is five inches across, and of the richest colors and most singular markings. The *pavonia* is small, and beautifully marked, almost looking like a butterfly. This, however, is not hardy, and is suitable for winter-flowering in the house. The others are perfectly hardy, needing scarcely ordinary care. The *I. Persica* also is admirable for winter-flowering. A few years ago, in almost every garden a clump of Iris was to be found, but being common varieties, they have been abandoned, like many of our old and meritorious flowers. It would be well now to introduce some of the improved varieties into our gardens, and we are quite sure they would afford the greatest satisfaction. The *Anglica* and *Hispanica* classes, and the *Susiana major*, are especially desirable for garden culture."

THE COLCHICUM, (fig. 171,) sometimes called the Autumn Crocus, is desirable as a handsome autumn bloomer. It is bulbous, and has the singular habit of throwing up its leaves in spring, and flowers in autumn.

It is quite hardy, and may remain in the ground; or if planted in pots will bloom as a house plant at the same time as in open ground.

Fig. 371.—*Colchicum.*

Fig. 372.—*Yucca flaccida.*

Fig. 373.—*Yucca filamentosa.*

THE YUCCAS are a noble genus of showy plants, so distinct in appearance from most ornamentals that they may be made to form a special characteristic in landscape gardening where the climate will admit of the general cultivation of the more tender species. *Yucca flaccida*, shown in fig. 372, is entirely hardy at the North, where its masses of evergreen leaves are always a conspicuous object in gardens, and its tall stem of nearly white flowers in summer make it one of the most desirable ornamentals. *Yucca filamentosa* (fig. 373) is a fine species, but not quite so hardy.

GLADIOLUS is an extensive and beautiful genus of plants, some of which are hardy, and others half hardy. (Fig. 374.) *G. communis* is perfectly hardy, and when once planted, will retain its place and bloom for a long series of years with no care or attention. Among the many showy South African species, *G. gandavensis* is one of the most brilliant.

G. floribundus, *G. cardinalis* and *G. psittacinus* have been extensively used for hybridizing, and have given innumerable beautiful varieties, many of which are simple seedlings. Being tender, the bulbs require taking up for winter.

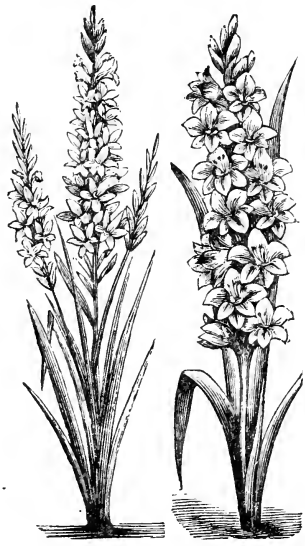


Fig. 374.—*Gladiolus.*

Floral Conveniences.

Window Brackets. — These are very convenient for the support of flower-pots in rooms, and being jointed, they bring the plants directly in front of the light, or they may be moved one side when desired. Fig. 375 is simple in structure, but is capable of holding four pots. Fig. 376 represents one for a single flower-pot, and is dark bronze, handsomely ornamented.

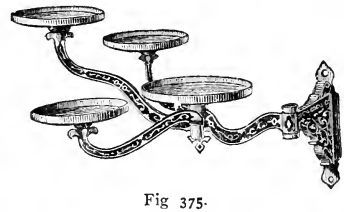


Fig 375.

Fig. 376.

Fig. 377.—*Pot of Bulbs.*

The fine effect produced by a pot of good size, filled with various easily blooming bulbs, is shown in fig. 377.

Plant Cases.—The various modifications of the original Ward cases, for keeping house plants with little care, are well known to our floral readers. The smaller ones are most convenient when the bell-glass is adopted, as in fig. 378. For larger cases they are made to receive plates of glass, as in fig. 379. As the glass retains the moisture, they rarely

require care in watering. The plants should be slightly ventilated occasionally. Ferns are well adapted to the bell-glasses, as well as other plants. Cases obviate the inconvenience of

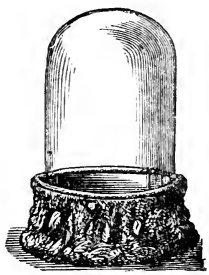


Fig. 378.

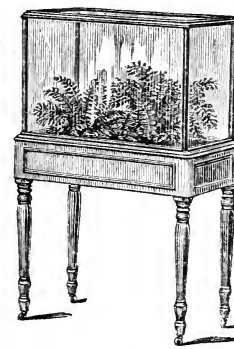


Fig. 379.

soiling carpets in watering plants. They are, of course, to be excluded from frost.

Fig. 380 represents an open case set in a window, and capable of receiving quite a number of pots, where they may always have a strong light. It has an ornamental effect not only in the room, but as seen from without.

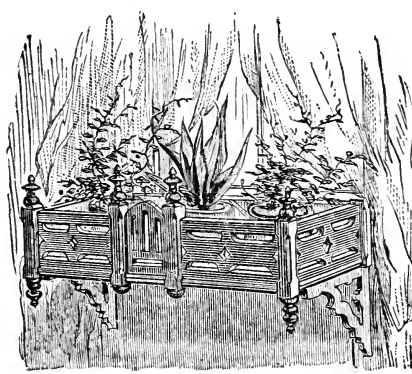


Fig. 380.

THE FLORAL ATOMIZER, (fig. 381.)—This is a neat and convenient little instrument for forcing any liquid in fine spray over delicate plants. It

Fig. 381.—*Atomizer.*

may be used for applying whale-oil soap, and other insect repellers; and we have found it useful for watering small seedlings in pots.

VASES ON LAWNS.—Of all the adornments of the lawn, nothing is more effective than a well filled and a well kept vase. Of course it is better to have one of a graceful form; but almost anything will look well if adorned with healthy, and particularly, drooping plants.

USEFUL FACTS AND TABLES.

FRICTION OF ROADS.—Careful experiments show that a horse will draw a load on a level, newly-graveled road 8 times as great as the actual force applied; on a common earth road, 16 times; on a hard, smooth road, 24 times; on the best McAdam road, 50 to 60 times; on the smoothest oak plank road, 70 to 100 times; on the best railroad, 280 times as much. Thick or deep mud on a road requires a force 4 or 5 times as great as on a dry one, varying however greatly with its depth and stiffness. The diagram (fig. 382) shows the difference in some of these roads, the steepness indicating that the same power would be required to draw a load over them as up an inclined plane with a hard road.

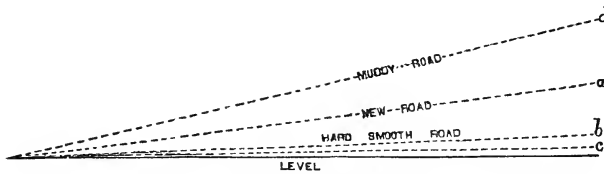


Fig. 382.—a, *Newly Graveled Road*; b, *Hard, Smooth Road*; c, *McAdam Road*; d, *Muddy Road.*

APPLICATION OF STRENGTH.—The following table gives the results of experiments with human strength, variously applied for a short space of time, the first column of figures giving the force of the hands on the tool, and the second the force of the tool on the object:

	100 lbs.	100 lbs.
With a Drawing Knife,	100	about 800
Large Auger,	84	do. 250
Screw-driver, one hand,	72	do. 1000
Bench Vice handle,	60	180 to 700
Windlass, one hand,	36	36
Hand Saw,	16	150 to 700
Brace Bit,	14	14 to 70
Button Screw, thumb and finger,		

WIRE AND HEMPEN ROPE.—The British Admiralty found that a wire rope 2 inches in circumference was as strong as a hempen rope 5 inches in circumference, and either would bear 7 tons just before breaking. A wire rope 3 inches in circumference was equal to one of hemp 8 inches, and bore 13 tons. One 4 inches in circumference was equal to hemp 10 inches, and sustained 21 tons. In practice a rope should not be subjected to more than half its strength. Manilla is about half as strong as hemp.

STRENGTH OF COMMON ROPES.

	Breaking Weight.	*Borne with Safety.*
One-eighth inch diameter,	78 lbs.	31 lbs.
One-fourth inch do.	314	125
One-half inch do.	1,250	500
One inch do.	5,000	2,000
One and a fourth do.	7,500	3.000
One and a half do.	12,500	4,500

VARYING STRENGTH OF ROPES.—A good, twisted hempen rope will support more weight before breaking if small, than when large, in proportion to its size. For example, between half an inch and an inch in diameter, it will support 8,700 pounds for each square inch of section; from one to three inches in diameter, 6,800 pounds for each square inch; if from five to seven inches, it will bear only 4,800 pounds per square inch. Multiply the square inch by the decimal 0.7854, and the product will be the strength of the round rope an inch in diameter.

STRENGTH OF WOOD, PULLED LENGTHWISE.

Each rod was one-fourth of an inch square.

Ash, toughest, broke with	1,000 lbs.
Locust,	1,280
Elm,	837
Pitch Pine,	750
Beech and White Oak,	718
Cedar,	712
Maple and Chestnut,	656
White Pine,	550
Walnut,	487
Poplar,	437

Broken Sidewise, one inch square, one foot long.

Hickory,	270 lbs.
White Oak, seasoned,	240
Ash,	175
Chestnut,	170
Yellow Pine,	150
White Pine,	135

PILLARS OR SUPPORTS.—A support an inch square will bear the following weights before being crushed:

Cast-iron, best,	57 to 88 tons.
Fine Brass	81
Cast-copper,	58
Tin cast,	8
Lead, cast,	4
Oak,	about 4
Pine,	nearly 2
Elm,	over 1
Hard Brick,	1

SLOPE OF HEAPS OR BANKS.—Wheat flour, falling from a spout, heaps up at a slope of 44 degrees from a level; sawdust the same; dry sand, 40 degrees; wheat, 37 degrees; gravel, 35 degrees; pulverized earth, about 37 degrees.

A CUBIC FOOT of cork weighs about 15 pounds; white pine, 30; coke, 32; anthracite, 53; tallow, 59; water, 62; salt water, 64; live oak, 70; loose earth or sand, 95; common soil, 124; brick, 125; clay, 135; cast-iron, 450; tin, 456; wrought iron, 486; steel, 490; brass, 538; copper, 555; lead, 709. From these figures the size of a ton load may be calculated.

LEAD BALLS a fourth of an inch in diameter require about 300 to a pound; half an inch in diameter, 36 balls; an inch in diameter, 4 balls.

A CUBE of atmospheric air measuring 68 feet each way will weigh a ton.

SOUND under water moves more than three times as fast as in air.

MELTED SNOW produces about one-eighth of its bulk of water. If closely packed, about one-fourth. The accompanying figure (fig. 383) shows the quantity of water from snow; the dotted line the height of the water from solid or packed snow.

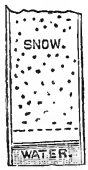


Fig. 383.

GAS.—One and a half cubic feet of gas burning for one hour will give about as much light as a good tallow candle.

GREEN AND DRY WOOD.—Fresh green wood loses about a third of its weight in seasoning, equal to 156 gallons in every cord. The burning of one cord of green wood absorbs as much heat in evaporating this extra water, as would be sufficient to heat 780 gallons from freezing to boiling. Seven cords of dry hard wood have as much heating power as eight cords of green. The farmer who draws 50 cords of green wood on his wagon, draws over 20 tons more of water than in dry wood.

FRAUDULENT BALANCES are detected by changing the weights to opposite sides.

CONTENTS OF A BUSHEL.—A standard bushel is a measure 8 inches deep and 18½ inches inside diameter, containing 2,150 cubic inches. The heaped bushel requires 6 inches in the height of the cone above the top of the struck bushel, and contains 2,748 cubic inches in all. From these figures the farmer may calculate the contents of his granaries, and divide them into different quantities by horizontal marks, so that he may know very nearly at any time how much grain there is on hand, by observing the numbers on these marks.

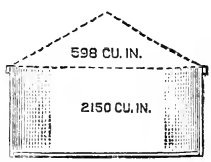


Fig. 384.—*Capacity of a Bushel.*

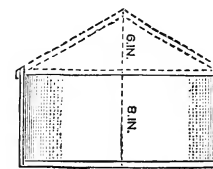


Fig. 385.—*Measure of a Bushel.*

EXPANSION OF IRON.—Cast-iron expands one hundred-and-sixty-thousandth part by receiving one degree of heat. Wrought-iron expands a hundred-and-forty-thousandth part. An iron rail 20 feet long, on a railway, would vary in length in the greatest changes of weather, in the sun's rays, about a fourth of an inch.

AIR expands one four-hundred-and-seventy-ninth for every added degree of heat.

The weight of a *column of water* at 60° Fah., and 33 feet high, is equal to that of a column of the atmosphere having the same cross section.

HEATING POWER.—The following figures show the heating power of different substances of equal weight: Peat, 32; oak wook, seasoned, 46; oak, dried on a stove, 59; pine, seasoned, 54; anthracite, 95; alcohol, 110; olive oil, 145; tallow, 150.

Twelve pounds of fresh water have been evaporated in tubes with one pound of anthricite. In a common locomotive boiler, about 7 lbs. at 212°.

It requires 800° Fah. to render a solid body luminous by heat; in the dark, 650° or 700°; in daylight, nearly 1,000°.

A bushel of charcoal from hard wood weighs about 30 pounds.

A cubic inch of water is converted by evaporation into 1,700 cubic inches of steam.

MELTING POINTS.—Mercury melts at —39°; ice at 32°; tin, 421°; lead, 594°; zinc, 740°; silver, 1850°; brass, 1900°; gold, 1980°; copper, 2160°; cast-iron, 2700°.

FREEZING AND BOILING POINTS.—Brandy freezes at 7°; ether boils at 98°; alcohol boils at 174°; linseed oil boils at 600°; mercury boils at 630°. Iron is bright red in the dark at 750°, and at twilight, 850°; red hot by day, 1050°.

RADIATION.—Blackened tin will radiate or receive heat 8 times as fast as bright tin. Hence water in a tin boiler, over a charcoal or anthracite fire, will become heated 8 times as soon by smoking as when the tin was bright.

ALLOYS.—German silver is one part copper, one of zinc, and one of nickel. Britannia is one part tin and one of antimony, melted together, and one part of antimony and one of bismuth added. Telescope mirrors, two parts copper and one of tin. Fusible metal, melting in boiling water, three parts tin, five of lead, eight of bismuth. Pinchbeck, five parts copper and one of zinc. Bronze for medals, twelve parts copper and one of tin. Brass, two to three parts copper and one of tin.

CONDUCTORS OF ELECTRICITY.—Calling iron one, tin would be one and a half, lead and platina five-sixths, zinc and brass two, silver eight, gold four, copper six, bismuth one-sixth.

HARDNESS OF METALS is in the following order: Iron, platina, copper, silver, gold, tin, lead. The Creator has given us the strongest and most useful metal in the greatest abundance, namely iron.

SPRINGS are weakened by use, but recover by rest.

CEMENTS.—Powdered chalk added to common glue makes it stronger. Boil one ounce of glue with one gill of milk, or in that proportion, and it will resist the action of water when used. White lead paint, with over half as much iron borings, will make a cement for steam or hot water pipes. For cracks in stoves, mix borings or filings with salt water and a small quantity of sal ammoniac.

Plaster of Paris mixed with a solution of borax, rebaked, pulverized, and mixed with a solution of alum, forms *Parian marble.*

Liquid Glue is made of shellac three parts, India rubber one part, dissolved in separate vessels of ether with gentle heat; then both mixed and kept corked. It is very strong, and resists hot or cold water; thinned with ether, it renders the seams of leather water-proof.

Mucilage or Paste, that will keep months in a corked bottle without change, is made simply by adding to gum tragacanth several times its bulk

of water. Put in a moderate quantity of the gum, as it swells largely. It may be had at small cost at any drug store.

DRAINING LAND.—An acre in a wet time contains about one thousand spare hogsheads of water. A pipe tile 2 inches in diameter, and 80 rods long, will drain a strip of land two rods wide. A descent of one foot in a hundred will carry off 250 hogsheads in 24 hours; one foot in ten, 800 hogsheads. With a pipe 3 inches in diameter the quantities carried off will be about 650 and 2,000 hogsheads respectively.

CONTENTS OF CISTERNS.—For a circular cistern, and for one foot of depth, one—

Five feet in diameter will hold				4.66	barrels.
Six	do	do.	do.	6.71	do.
Seven	do.	do.	do.	9.13	do.
Eight	do	do.	do	11.93	do.
Nine	do	do.	do.	15.10	do.
Ten	do.	do.	do.	18.65	do.

Multiply these quantities by the number ot feet in depth, and the product gives the whole contents. For any larger cistern the capacity increases as the square of the diameter, and is readily calculated from the above measures.

THE QUANTITY OF RAIN WATER falling on roofs in a year is commonly much underestimated. Three feet of rain per annum, the average quantity, gives 72 barrels for each space of 10 feet square; a barn 30 by 60 feet yields from its roof each year 650 hogsheads of rain water, most of which is wasted.

A LEADEN BULLET dropped from a balloon one mile high would be 18 seconds, or nearly a third of a minute, in falling; and the last second it would fall 560 feet, equal to 33 rods.

The water pouring over the Yosemite Falls, 1,600 feet high, is 10 seconds in falling, and during the last second its velocity is nearly 300 feet, when the stream is large.

USEFUL RULES.—To find the *circumference of a circle:* Multiply the diameter by 3.1416, and the product will be the circumference, (fig. 386.)

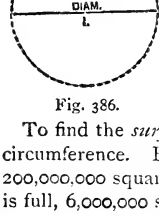


Fig. 386.

To find the *area of a circle:* Multiply the square of the diameter by the decimal .7854, and the product will be the area, (fig. 387.)

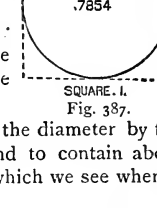


Fig. 387.

To find the *area of an ellipse:* Multiply the long diameter by the short one, and the product by the decimal .7854.

To find the *surface of a sphere or globe:* Multiply the diameter by the circumference. By this rule the earth will be found to contain about 200,000,000 square miles; and the half of the moon which we see when it is full, 6,000,000 square miles.

To find the *solid contents of a sphere or ball:* Multiply the cube of the

diameter by the decimal .5326, and the product will be the contents. By this rule the earth is found to contain 270,000,000,000 cubic miles, which to count one a second would require 10,000 years.

To find the *solid contents of a cone:* Multiply the area of the base by the height, and one-third of the product will be the content. To find the area of the circular base, multiply the square of its diameter by the decimal .7854. By this rule a Himalaya mountain averaging 5 miles high, with a base 10 miles in diameter, will be found to contain 130 cubic miles, or 520,000,000 cubic yards.

The same rule will give the contents of a square pyramid, without reducing the circle.

French Weights and Measures.

The great superiority and convenience of the French decimal system of weights and measures is leading to a frequent reference to them, and their gradual adoption. Hence the frequent inquiry for an explanation of them.

Measures of Length.

The measures of length are founded on the standard or *metre*, and hence the term *metrical* system. The metre is the ten-millionth part of a meridian extending from the equator to the pole, and is accurately determined by astronomical observation to be 39.37 English inches. The Greek numerals prefixed show the increase, and the Latin numerals prefixed show the decimal decrease, in the following table:

One Myriametre,	10.000 metres.	One Metre,	39.37 inches.
One Kilometre,	1,000 do.	One Decimetre,	0.1 metre.
One Hectometre,	100 do	One Centimetre,	.01 do.
One Decametre,	10 do.	One Millimetre,	.001 do.

A kilometre is about five-eighths of a mile; a myriametre over six miles.

Measuring Land.

For measuring *land* the term *are* is adopted, which is a decametre squared, or 100 square metres. A *hectare*, or 100 *ares*, is equal to nearly two and a half English acres.

Measures of Capacity.

For measuring *capacity*, a decimetre is cubed, and is termed a *litre*, or about 2⅛ English wine pints.

Measures of Weight.

For *weight*, a centimetre is cubed, and applied to distilled water at 32° Fah., and is called a *gramme*, and is equal to 15.4 grains.

Milligramme,	.0154	grains.
Centigramme,	.1543	do.
Decigramme,	1.543	do.
Gramme,	15.433	do.
Decagramme,	154.331	do.
Hectogramme,	1543.31	do.—about 3½ ounces.
Kilogramme,	15433.16	do.—nearly 2¼ pounds.
Myriagramme,	154331.59	do.—over 22 pounds.

A Quintal, 10 Myriagrammes.

USEFUL MECHANICAL SUGGESTIONS.

By L. D. Snook, Yates County, N. Y.

A CHEAP LAND ROLLER.—The rolling of the ground after the crops in the spring have been sowed and harrowed is almost universally practiced, and with favorable results. Very many styles and forms of field rollers are in use, and while I do not recommend a small roller where a large one can be afforded yet rather than do without one, I would use a log roller, and construct it similar to the form shown in fig. 388, of which *A* is a log of some hard, durable and, if possible, seasoned wood, at least 2 feet in diameter, and 8 feet in length. For an axle, use at each end a round bar of iron 1½ feet in length and 1½ inches in diameter, firmly driven 10 inches into each end. A wooden washer, 10 inches square and 2 inches thick, is then nailed upon each end of the log, encircling the

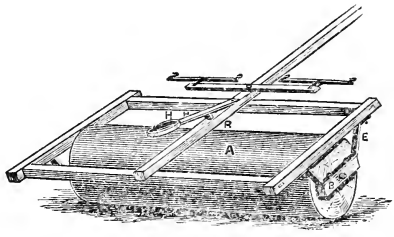


Fig. 388.

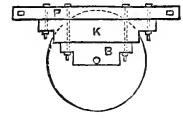


Fig. 389.

iron shaft, to prevent the end of the log from rubbing the frame. *E* is an iron brace bolted underneath the end of the frame, to which wooden box *B* is bolted; this should be hard, well seasoned wood. The seat spring *H* is bolted to the top of the tongue, and kept at an angle by wedge shaped piece *R*. The frame should be of well seasoned 3 by 5 inch stuff, set up edgewise. In fig. 389 wooden supports for end of frame are used, instead of iron brace *E*, being bolted and made in sections, as shown. Nail a piece of leather over the axle to keep the dirt out. Use soft grease; paint and keep under shelter. The total cost of a roller like this should not exceed $4.

How to Mark Out a Circle without a Compass.—It is often desirable or necessary to describe a circle upon a board, paper, cloth, etc., where no compasses are at hand, and if at hand, are not of sufficient size to produce the circle required, or, as in describing circles and semi-circles upon cloth, a pencil must be made to mark instead of the point of an iron compass. In any of the above cases either of the plans illustrated will do the business. The arrangement shown in fig. 390 is the simplest, and where absolute accuracy is not required, will be found an easy method. After locating the centre of the circle, drive a small nail, or stick an awl, partly in the place, as at *E*, over which, place one end of a looped string, *B*

The other end encircles a lead-pencil, *K*, which is grasped in one hand, pressing the point of the pencil upon the article to be marked while moving it around the centre at *E*, producing the desired mark as at *A*.

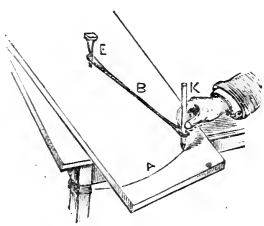


Fig. 390.

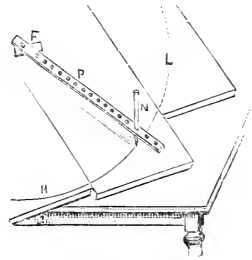


Fig 391.

The arrangement shown in fig. 391 is a little more expensive, as well as a permanent affair, and its results more accurate than the preceding method. *P* is a stick of hard wood two or more feet in length and half an inch square, one end of which is loosely attached to block *F* by a screw. Holes five-sixteenths of an inch in diameter are bored three-quarters of an inch apart, its entire length. The block *F* is placed at the centre, and kept there by pressing on the top of the screw with thumb or finger, which will allow the arm or sweep *P* to move around in a circle, and a lead-pencil *K* closely fitted into one of the holes makes the mark, as at *H*.

CARRIAGE STEPS.—No well regulated farmhouse fence should be considered complete without a carriage step at the front gate. A cheap form of step is shown in fig. 392. It is 2 feet 4 inches high, $2\frac{1}{2}$ feet wide, and $3\frac{1}{2}$ feet in length, and is provided with two steps. Two by three or 3 by 3 inch pieces are placed upright at each inside corner, to nail to. This is generally placed at the left of the gate as you enter the yard, and *always* have the latch end of the gate nearest the step, as it will be far more convenient. A cheaper form is given in fig. 393, which will answer quite as well as the former, although not quite as neat in appearance. To the top of the hitching bar *B*, connecting the two posts *A A*, is firmly nailed one end

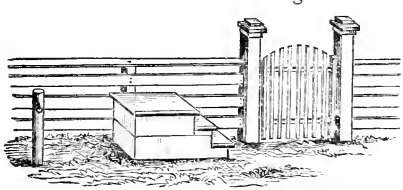


Fig. 392.

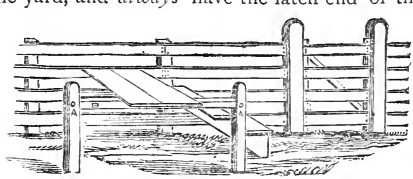


Fig. 393.

of 2 or 3-inch boards, the other end being nailed to the top of one of the boards on the fence, or to a cleat nailed parallel with bar *B*, and at the same height, if it be desired to attach it to a picket fence. Two or three steps are placed on the side toward the gate. The cost of either plan is but a few shillings, as any one handy with tools can make one in three or four hours, and it will be time well spent.

REMOVING SNOW FROM WALKS.—Snow is quickly removed from walks, before it becomes packed, by the use of the hand snow-scraper shown in fig. 394, the dimensions of which are: Scraper, *A*, 3 feet long, 6 inches wide, and three-quarters of an inch thick, and made from some well seasoned, light wood. The handle is 4 feet long, the end let into and firmly nailed to top of scraper, as shown. Wooden braces, *R R*, reach from the handle to within half an inch of the lower side of the scraper, at which point they are attached by screws or nails. When the snow is light, this scraper is shoved along the walk until snow falls over the top, or is moved with difficulty; then pushed into the street, or out of the way. With this plow a large surface is cleared in a few minutes.

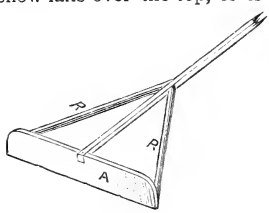


Fig. 394.

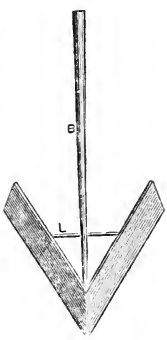


Fig. 395.

Where it is desirable simply to clear an open space about two feet wide, a sharp snow plow like the one in fig. 395 is very useful. Two boards, each 2½ feet in length, are secured together as shown, with handle *B* nailed upon the inside, near the bottom, and projecting upward at an angle that will allow the edge of the boards to rest upon the walk with the end of the handle about 2½ feet from the ground; it is securely retained in position by a brace, *L*, passing through the handle and upper edge of the board, to all of which it is firmly nailed. By the simple operation of pushing this arrangement in front of you along the walk, the snow is removed to both sides much faster, and with greater ease, than by the operation of shoveling.

ALWAYS UP TO TIME.—The wide-awake farmer should make every preparation in autumn for the timely performance of work the coming season. A week of delay in the routine of work may derange it for the whole summer. Crops sowed late are reduced in amount. Weeds allowed to grow cost ten-fold to destroy. Those who have ever traveled on an express train out of time, will understand this. Every hindrance is increased ten-fold. Every local train must be waited for. Ten minutes too late is two hours loss. Provide every facility therefore in time.

ICE PONDS AND ICE GATHERING.

A CORRESPONDENT of the COUNTRY GENTLEMAN, Mr. GEORGE GEDDES, describes his mode of constructing an ice-pond, from which he readily obtains, near at hand, an abundance of pure ice, even during the warmest winters in Central New-York. The fact that formidable disease has been caused by using ice cut from ponds or streams containing impure water, should lead to great caution, and none should be used unless obtained from water pure enough for drinking purposes. For although much of the impurities held in solution are cast out in the process of freezing, the invisible germs of disease have been found to remain.

Mr. Geddes' ice-pond covers 100 square rods of ground, equal to nearly two-thirds of an acre. He finds this more than enough to supply himself and neighbors in the warmest winters. Still water in a shallow pond will freeze more rapidly than in a running stream or deep lake, and the ice will be clearer. If frozen only half a foot thick, there would be enough furnished by a single cutting from 6 square rods to fill an ice-house 10 feet square and 8 feet high, a larger amount than is required for an ordinary family. When it is remembered that the crop may be harvested several times during the winter, as it is successively taken from the surface of the water, it becomes obvious that a comparatively small pond is sufficient for common supply.

The one made by Mr. Geddes is in a small valley, and the stream which runs through it, and which is made up of springs which rise within a mile, is not interrupted by the embankment which separates the pond from the creek, and only enough water is admitted from the stream to maintain a level at a proper height. When at first the embankment extended across the valley, the water did not freeze sufficiently in open winters, and it became necessary to go several miles to another supply.

The water in the pond is about 3½ feet deep, and being drawn off when the season for gathering ice is over, the whole of the bottom and sides, except a narrow channel for drainage, is used in connection with adjoining lands for pasture. Before winter sets in, it is put in order by cutting with a scythe, removing the tufts of grass, which might injure the quality of the ice, and the bottom is flooded, to remove all light substances.

Experiments were made in cutting and handling, and the following mode adopted as the best: At the most convenient place for passing the ice over the dam, a weir was constructed a little above top-water line, about 5 feet wide. Scantling ways were made for the cakes of ice, with sides to keep them in place. They consisted of two pieces 3 by 4 inches, and 14 feet long, connected by cross-pieces, hinged on the pond side to the top of the dam, reaching out and sinking sufficiently to allow the cakes to be shoved on the scantling, and thus easily and rapidly over the top of the dam, on another scantling way, to the sleigh for drawing to the

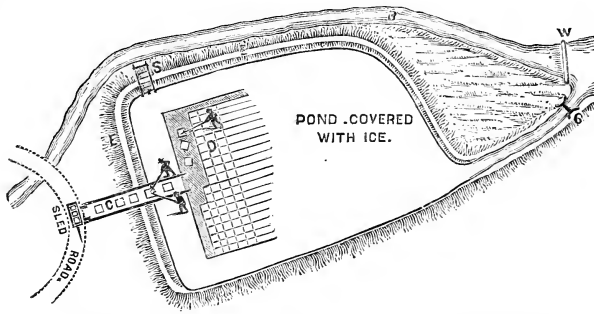


Fig. 396.—*Ice Pond*—S, *Sluice for Drawing Water out of the Pond;* W, *Waste Weir, level with the top of the Pond;* G, *Geared Gate;* E E, *Embankment;* B, *Brook;* C, *Blocks of Ice on Slideway;* D, *Blocks of Ice on Pond.*

ice-house. Two posts with a cross-piece should be set in the pond to make the slideway steady, and to keep it at the proper height, (fig. 397.)

The ice is cut with a cross-cut saw, the handle being taken from the end that goes under the water. This mode of cutting answers well in filling common family ice-houses. A channel is first cut for the slideway, and 10 or 12 feet beyond, for the men to stand while pushing the ice with their poles (fig. 398) up the slideway; and then the surface is laid out and scratched into regular blocks for the saw. For marking, four strips of boards are used, braced so as to keep square, fig. 399, after having used two long straight-edged boards to lay out a commencement, and to begin on two contiguous sides of the first cakes. This arrangement is shown in fig. 400. The saw is first used to cut from 1 to 2, then from 3 to 4, and so on across the front. Then, commencing at *b*, cut

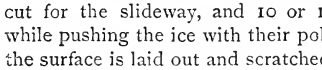


Fig. 397.

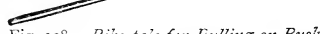


Fig. 398.—*Pike-pole for Pulling or Pushing Cakes of Ice.*

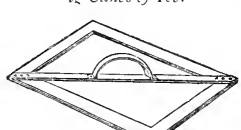


Fig. 399.—*Form for Marking Blocks of Ice.*

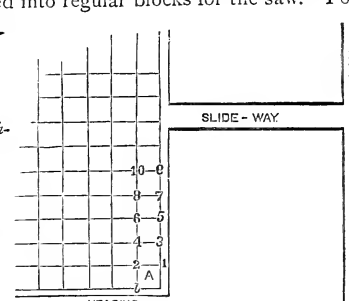


Fig. 400.

along to 2, 4, 6, &c., which will free the first series of cakes. The axe is used to make an opening at *A* for the saw. Two men will mark and cut for two others to load. The saw should be handled with sufficient skill to keep the blocks of ice square, straight, and of uniform size.

SUGGESTIONS IN RURAL ECONOMY.

DRY GARDEN WALKS.—Gravel walks for gardens and ornamental grounds should always be free from stagnant water or much moisture. Their peculiar value depends on their being dry in all kinds of weather, when wet grass or muddy soil cannot be walked upon. Unless, therefore, the natural soil is composed of gravel or coarse sand, with a free subsoil drainage, more or less artificial provision must be made to carry off the surplus water after rains or during periods of unusual moisture. If the soil is naturally heavy, the work must be thoroughly done, by digging out the soil the width of the walk to a depth of 2 or 2½ feet. If much water is likely to flow into it, a pipe tile should be carefully placed at the bottom, as shown in fig. 401, and provision be secured for its gradual descent and the discharge of the water. In ordinary cases this tile will be hardly necessary. The bottom is to be laid with round stones, if they are easily obtained from the neighboring fields, or with broken fragments, if only to be had from builders. Each successive layer should be smaller in size, until the broad ditch is nearly filled. A coating of broken cinders may then be placed upon them, or coarse gravel, to receive the final top finish of fine gravel or coarse sand. A thorough rolling will finish top the walk.

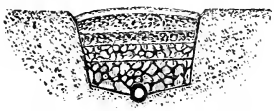


Fig. 401.—*Cross Section of Well-Drained Walk.*

If the natural soil is gravelly, and has a natural drainage, the excavation need not be more than a foot deep, to be similarily filled, as shown in fig. 402. The surface should have a slight convexity, and as the materials will settle slightly, it may be necessary to add some time afterwards a second top finish; and for the same reason more convexity is given at first, as shown in the cuts.

Fig 402.—*Section of Walk in Dry Soil.*

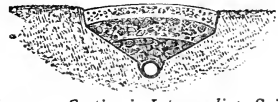


Fig. 403 —*Section in Intermediate Soil.*

In extreme cases the soil has been hard and dry enough to make a good walk when dug only a few inches, but this cannot often be relied on, and it is always best to form a stone bottom.

An intermediate amount of drainage is shown in fig. 403, which need

not have the tubular tile at the bottom, unless much water will be likely to settle in the walk.

Banking up Cellar Walls.—We marvel that any one should ever be willing to place a bank of manure against the exterior cellar walls of a dwelling, the odor as well as the appearance of which is not exceedingly attractive. Another common mode is to throw up an embankment of fresh earth, which is not much more ornamental. We have used another mode of protection, having a better appearance (fig. 404) First, rake up the fallen leaves from under the trees of the door-yard or orchard, and bank them compactly against the wall so as to form a slope about two feet thick at the bottom, and less above—varying according to the amount of protection required. Then take the trimmings from the evergreen screen, or from other evergreen trees which need shortening into shape, and place these neatly in an inverted position sloping against the leaves, cutting them just long enough for this purpose. They hold the leaves, add to the protection, and become a positive ornament instead of a disfigurement. They form a beautiful evergreen underpinning.

Fig. 404.—*Protecting House-cellars with Leaves and Evergreens.*

Improved Fences.—An important improvement is made both in the cost and efficiency of post and rail fences, by omitting one or two of the lower rails, forming a bank or ridge of earth in their place, and leaving a ditch on either side, as shown in cross section in fig. 405. These ditches and the bank prevent colts and other animals from pressing or leaning against the fences, and they thus become a more perfect barrier. It is not necessary to dig the post holes much more than half the depth otherwise required, as the banking up imparts strength and stiffness; and for the fence itself, not being so high, there is less side-strain on the posts. Fig. 406 is a cross section of the fence as commonly made, where it will be seen that a greater

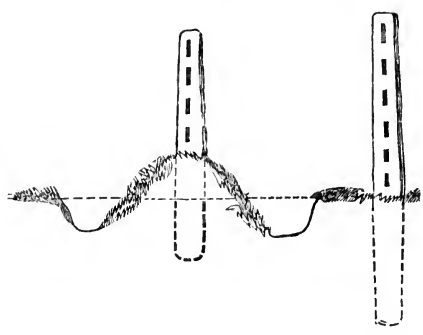


Fig. 405. Fig. 406.

depth must be given in order to secure firmness to the tall post with its six rails above. The easiest way to throw up the bank is to use the plow for this purpose, finishing with hand labor.

A very neat and good fence, occasionally seen, is built of posts and boards, the boards being 20 feet long, making each length between posts 19½ feet, after the boards are inserted, fig. 407. By this mode a great saving is effected in posts, the two smaller and intermediate ones being of refuse stuff, which may be more or less crooked, provided a straight side is laid against the boards. The boards are an inch thick, and the wider and stronger ones are placed at the top, where they are more exposed, and where greater strength is needed.

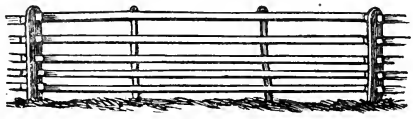


Fig. 407 —*Panel of Board Fence.*

The same advantages in omitting one or two of the lower boards and banking up with earth, that we have already pointed out, would be found with a similar modification of this fence.

BARBED FENCING.—Nearly every neighborhood has some resident who is annoyed by the unruly horses of a neighbor, or by fence-breaking or leaping cattle. We have known some landowners who have expended quite a sum of money in repairing good board fences that were broken down by neighbors' rampant horses. The best remedy we have yet seen for this trouble is the new barbed wire, of which there are several different kinds manufactured and sold, and all seem to answer a good purpose. If applied to a new board fence, the wire may be stapled on in place of the top board, or rather about half the usual space for the top board may be given for the barbed wire, as shown in the cut, fig. 408. Horses and colts which have been in the practice of leaning against fences and crowding off the boards, or leaping over them, quickly learn to show great deference to a fence armed in this manner, and to maintain a respectful distance. Even idle boys' rambles are not so apt to extend across fields provided with such barriers.

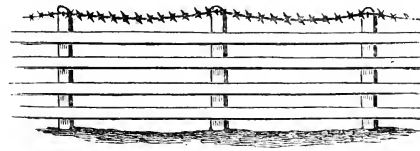


Fig. 408.

If the fence is already made, the barbed wire may be stretched from post to post, on the side opposite to that on which the boards are nailed, at or near the top. This side should, of course, be next to that from which the danger is apprehended, if practicable. Or it may be laid on the cap-board, and stapled from post to post. Old and weak board fences have been thus made strong against the passage of unruly animals.

IMPROVED HORSE-SHOE.—GEORGE GEDDES furnishes the COUNTRY

GENTLEMAN with a description of the kind of horse-shoe which he has used for several years with great success, to prevent the balling of snow.

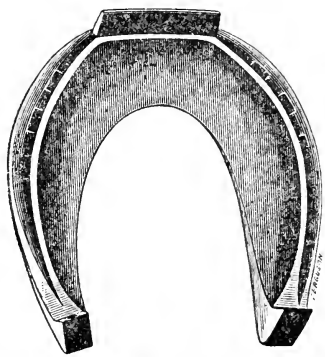


Fig. 409.

It is so made that the shoe slants to an edge on the inside so that a snow-ball cannot be held by it. The snow, in common horse-shoes, is crowded or driven into the vacancy within the shoe, and held there. The improved shoe (fig. 409) is sloped or beveled from the line of the nails to an edge on the inside; and it is so much wider at the toe, that the snow cannot be held by it. The hoof is not pared away inside to make a deep cavity between the shoe and the hoof, but only so much that it may lie nearly flat. This kind of shoe never balls, and it wears well in summer. It requires more work by the smith to make it, but this labor is many times repaid by its advantages.

BUTTER WORKER.—M. C. WELD, in his account of Echo Farm, in the COUNTRY GENTLEMAN, gives the following description of the butter worker employed on that farm:

The machine (fig. 410) is capable of working about thirty pounds at a time. It consists of a turn-table, in the form of an exceedingly flat truncated cone, upon which the butter lies, and which is caused to revolve by means of a crank-shaft, set in a frame, having a cog-wheel working in the gearing, seen on the inside of the turn-table. There is a conical, grooved presser, or compound paddle, which is set upon the same crank-shaft, and which revolves like a paddle-wheel, making deep depressions in the butter, through which the butter-milk runs down to the outside edge of the turn-table, where a channel collects it and discharges it into a pail set in the centre, underneath. An assistant turns the crank, while the dairy-woman watches narrowly the progress of the work,

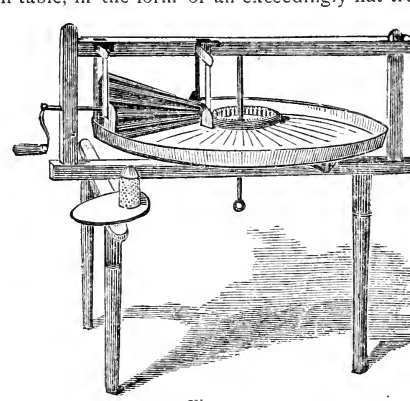


Fig. 410.

dredging in the salt and stopping the work before there is the least danger of overworking. I should say that the butter has two workings; one when it is first taken from the churn, at which time it is salted,—the other about a couple of hours afterwards. When finished, it is much freer of butter-milk than butter which ranks as of the highest grade in the New-York market.

STABLES WARMED BY CATTLE.—Tight and well built barns and stables, to be filled with cattle and horses in winter, will receive enough heat from the surface of the animals to prevent a freezing temperature inside. This is readily shown by a little calculation. Twenty large cows in a stable present about 800 square feet of surface, with a warming temperature epual to at least 50 degrees above freezing. A large stove would have about 20 square feet of surface, and when heated would average about 400 degrees above freezing. The 800 square feet of cattle surface, multiplied by 50 degrees, would give 40,000; the 20 square feet of stove, multiplied by 400 degrees, would give only 8,000—one-fifth of the former amount. If the rough iron radiates and conveys heat five times as fast as the hairy surface of the cattle, the latter would still possess as great a heating surface as the large stove. We have known large, well-built, ventilated cow stables kept warm in this way, so as never to freeze, and the sand or other absorbent daily spread in their stalls remained unfrozen till carted out when done with.

ROAD DUST.—Before wet weather sets in, every farmer should secure a few barrels of road dust from the frequented highways, for various uses during the coming year. It is good for the manufacture of hen manure, by placing the dust and the droppings in thin alternating layers in barrels, as it accumulates; and nothing is better for vaults. A barrel of the dust placed in the corner of a privy, with a long-handled pint dipper always in it, makes the arrangement better than a water-closet, if each visitor will only throw down half a dipper of the dust. It never gets out of order; never freezes up; and all odor is neutralized. Mixed with coal ashes, it is still better, and the contents of the vault are as easily removed as sand, and are a valuable manure.

FARMERS' HOMES.—It is worthy of much thought and attention on the part of farmers to throw such influences around their children as will attract them to country life. This aim should be well studied in winter, but should not be forgotten at other times. It does not require a heavy expenditure of money. Intelligent economy is better than ignorance with waste. First, the farmer's home and its surroundings should be made complete. An ornamental garden and a neatly planted dooryard should hold a prominent place in making these provisions. Workingmen's cottages will be found economical in the long run, by allowing hired men with families to board themselves—preventing confusion in homes and avoid hard work for women. Foster in young people every rural taste and rural study. Help and encourage those who like the culture of flowers.

Facilitate experiments on the farm and in the garden. Provide every assistance to those who have a taste for natural sciences. A room should be secured as a museum, where insects, dried plants, minerals, fossils and stuffed birds may be kept, and insect transformations witnessed, and where cheap philosophical and chemical apparatus may be used. Procure books to assist in all studies connected with these objects. This is the way to make intelligent and useful farmers, instead of idlers, spendthrifts and horse jockeys.

WILLOW HEDGES.—Experiments have been made on the farm grounds at Cornell University, with a large growing species of willow for hedges. Sticks of about 4 years' growth, and about 2½ inches in diameter, are cut from trees. They are cut 4 feet long, and sharpened at one end. A deep double furrow is plowed, manure is thrown along the bottom, and then a subsoil plow is passed several times, deepening the soil and mixing the manure. The sharpened willows are then driven into the furrows, about 7 inches apart, leaving them even at the top, and about 2 feet high above ground. A strip of board or lath is then placed on the top, and a nail driven through it, into each willow stick, secures it to its place until in a year or so it is no longer needed. The smaller portion of each willow is made into smaller stakes, which are treated in the same way, but not mixed in with the larger, those of equal size being carefully assorted and placed together.

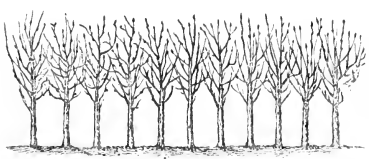


Fig. 411.—*Willow Hedge—First Year.*

The young hedges which we saw were started last spring, and the mass of shoots at the top had already grown 2 or 3 feet. It is intended to trim them up as they advance in growth, giving them height to serve as a screen against winds around the cattle yards, where it is expected that the hedge will not only be "pig-tight, horse high and bull strong," but formidable enough to stop a heavy locomotive. The willow is an imported sort, a stout grower, and readily rooting, and appeared not unlike that known as "bee willow," which would doubtless answer the same purpose.

Our readers, or some of them, will of course see objections to such hedges, and they are not claimed to be faultless, but to possess some valuable advantages.

SNOW AS MANURE.—The remark has been often made that snow is the poor man's manure, and much stress has been laid on its value by writers of little scientific accuracy, on account of the presence of the ammonia and nitrogen which it contains. An analysis of several specimens of snow was made during the winter of 1876–7, at Union College, by F. J. Ballart and F. M. Comstock, under the supervision of Prof. Perkins, which showed that no samples of snow contained more than about a millionth part of nitrogen, and after the snow is old it contains much less. From these analyses it was

shown that only about one pound of nitrogen falls on an acre in a winter. Some European chemists, where, in thickly peopled regions, the nitrogen is rather greater, found that only seven pounds of nitrogen fell, in rain and snow, on an acre, in a whole year. This is about one-tenth of the amount required for some crops, and even if all were taken up from the soil, (which is impossible,) it would afford but a scant supply for the needs of growing plants. Hence we infer that the great benefit of rain is in *watering* the earth, and of snow in *protecting* it.

MANURE IN WINTER.—Manure may be applied to some trees and plants with much advantage in early winter. Dwarf garden trees and goosebery and currant bushes, which do not grow with sufficient vigor, may be mulched with manure, and what is not washed into the ground before spring may be then spaded in. Dwarf pear trees, which in exposed places are liable to be injured by the freezing of the soil, are benefited by the winter covering, and by the enriching of the soil. It is also well to apply a heavy coat of manure to asparagus beds, which have not yet received any. By some attention, much may be done to prevent the waste of manure as it accumulates during winter. The droppings in hen houses should be regularly swept up and deposited in stout barrels, with alternating layers of some good absorbent. Road dust is best, but if none was saved in summer, use well-sifted coal ashes. If the road dust is from clayey or loamy regions, layers of this and of the droppings, of equal thickness, will answer; but if coal ashes are employed, there should be four or five times as much. Keep stables frequently and well littered, to save the liquid portions, and wheel out the contents as often as twice a day into a well made manure or compost heap. Where an abundance of straw could not be obtained, we have seen excellent manures made by daily spreading a coating of fresh sand, from a sand hole kept open for this purpose, the stables being so warm as to prevent much freezing.

CORNSTALKS IN MANURE.—Cornstalks are largely fed to cattle, which strip off the leaves and husks only, and leave the larger stalks to be trodden under foot, making the manure so coarse and fibrous that it does not rot down in time to be spread in spring. If the owner has a tread-power, or other horse-power, by which he may drive a straw-cutter, he can cut up his stalks rapidly, and at little expense. The cattle will eat a much larger portion if thus treated, and any portion that may be left will go to the manure without giving it the coarse texture of unreduced cornstalks. Such manure may be easily spread at any time in spring, or it may be drawn out as fast as it accumulates in winter, and easily spread at once, according to the approved and successful practice now adopted by many farmers.

A GOOD HARROW.—The following description is given by NEWTON REED, in the COUNTRY GENTLEMAN: The bars (eight) are of seasoned white oak, 3 by 3 inches, and 5½ feet long, and have an entire spread of the outside teeth of 8 feet. The bars are bolted together where they meet,

(one of the pair being beveled,) except at the middle, where there is a hinge. The draft is by a bar 6½ feet long, which is coupled to the four forward points by hooks and links, and is readily removed. The teeth—40 in number—are a foot apart lineally, and make furrows 2½ inches apart; that is, there are 40 furrows in the 8 feet, which is the width of the harrow. The teeth are of ⅞-inch round Bessemer steel, and are screwed into the wood, going just through it.

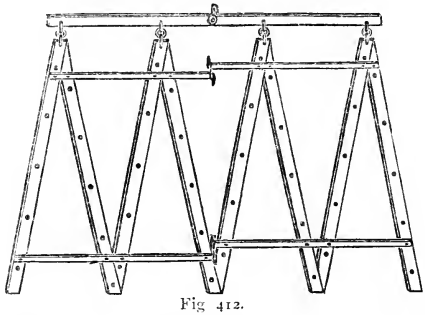


Fig 412.

It is evident that as the draft is applied to each of the four parts of the harrow, there can be but little strain on any part of it, and that when a tooth is held by a fast stone, the strain is lengthwise of the timber, instead of across it, thus having no tendency to split, as in some square harrows. This harrow is for sod land and for seeding, and cannot take the place of the Thomas smoothing harrow. It is easily constructed, and is not patented. The steel for the teeth costs in Duchess County, N. Y., $4.25. After they are worn a while, they can be turned half-way round. It makes, with the horses, only a short team, and turns round readily.

SHRINKAGE OF CORN.—Diverse opinions are often expressed in relation to the loss in bulk and weight of corn, from husking time till the following summer or autumn. Several years ago we performed a series of experiments bearing on this subject, and reached several conclusions, which farmers generally should understand. We found the results to vary with the dryness or dampness of the autumn, and the degree of ripeness in the corn at the time of husking. The condition of the corn will vary considerably in different parts of the field, or in different ears in the same hill. It is essential, then, that a fair average be taken. The following are some of the results:

Corn in the ear, after an unusually damp season, was weighed the first of January, and by the following October had lost one-fifth part of its bulk. The weight of corn in the ear, of the northern eight-rowed variety, varied all the way from 68 to 75 pounds, to yield a shelled bushel of 60 pounds. Ears with small cobs, well dried, afforded scarcely 8 pounds of cobs to the bushel. With larger cobs, freshly husked, they may weigh 12 or 13 pounds. A moist cob is much heavier than a dry one. Farmers who sell corn in the ear should know the amount of loss from drying. As a general rule $1 per bushel for corn in the ear in summer is no better than 75 cents at husking time. Sold in the ear, it should always be weighed, not measured. We

found that a full, compact, heaped half-bushel, of moderate sized 8-rowed ears, contained 56 ears, weighing 24 pounds. Thrown in loosely, and heaped, there were only 44 ears, weighing 19 pounds. Shelled grain shrinks in bulk and loses in weight by long drying. In one case it lost one-twentieth of its bulk and one-eighth of its weight in three weeks, in a room heated with a stove. After some months, it shrank in bulk from its original condition as six is to seven, and lost weight so as to be as five is to six. Other experiments in cold rooms nearly correspond with this in results. It would therefore be better to sell shelled corn early in winter at 80 cents than the following summer at $1. With gourd seed or dent corn the results may be different, and they always vary some with seasons. Wheat loses much less by drying than corn.

HEAVY CROP OF BEETS.—Messrs. SMITH & POWELL of Syracuse Nurseries have given us the measurement of a crop of beets raised in 1876 on an acre of land. The variety is known as the Yellow Ovoid. The ground was thoroughly subsoiled, and well taken care of. The crop weighed 118,400 pounds, or about 59 tons—or at 60 pounds per bushel would amount to 1,973⅓ bushels. Successful nurserymen, who know that a very deep, well prepared soil is best for trees, often furnish some of the finest specimens of profitable farming, in the heavy crops which they obtain from vacant portions of their land, which should encourage farmers to discard superficial, and adopt thorough culture.

PREVENTING SUCKERS.—It is now well known that pruning trees in winter or early spring tends to promote vigorous growth, and that pruning in summer tends to retard it. Hence the great superiority of the practice of cutting down trees in summer if we wish to avoid the growth of suckers from the stump or roots. An intelligent lady, whose grounds we have often visited, has just been trying a few experiments. A number of common locust trees were to be removed, and a part were cut off in winter, and the rest during the summer season. The latter have sent up a few feeble suckers; the former at least *twenty times as many strong ones.* She has succeeded, however, in preventing entirely the growth of the suckers, both at the stump and at a distance from it, by placing a large quantity of common salt on the stump as soon as the tree is cut. It has proved completely effectual. If delayed until the suckers have started, it does no good.

EVERGREENS—Afford capital shelter from prevailing winds in winter. Plant a few, or a belt, on the side of the dwelling from which the prevailing cold winds blow. Those who cannot appreciate this ornament will find out how much fuel they save. They are still more useful, if possible, as a screen for cattle yards. There are two ways to procure them—from the nursery and from the margins of woods. The latter will suit many land-owners best, when they can obtain them within a few miles. Observe one rule, and you will not fail to make every one live, if they are not over eight or ten feet high, and grow exposed. This is to take a large

mass of earth, or muck, as the soil may be, on the roots—enough to hold them standing erect against the wind when set on the surface of the ground.

TRANSPLANTING THE OAK.—When at the nursery of Thomas Meehan at Germantown, he showed us trees of different species which had been repeatedly transplanted with entire success, the last time when three inches or more in diameter. Alluding to the difficulty in transplanting the oak, he says that if removed when two years old, cutting off the tap root, and again afterwards when the roots have again run downwards, there will be no difficulty; and that he has seen hundreds transplanted when twelve feet high and three or four inches in diameter, with little or no loss. Those who admire the beauty and grandeur of oaks, should bear these facts in mind.

QUICK GROWING SHADE TREES.—The Prairie Farmer names Cottonwood, Soft Maple and White Elm, if you want shade quickly at the expense of some other things; and Black Walnut, White Ash and Sugar Maple, if you can wait a little to get something valuable for timber.

IMITATING NATURE.—A late writer, in an argument against plowing orchards, says that "nature never plows, but mulches with a liberal hand." While mulching is often of great service, we cannot confine our operations to an exact imitation of nature, or we should be entirely relieved from the mandate "to dress and to keep" our kitchen and fruit gardens. Nature never grafts; never picks apples with a ladder; never builds fruit-houses; never plants trees in a row or in quincunx form; but permits the growth of pigweeds among cabbages, allows wild and domestic animals the free range of the garden, and never uses the hoe, rake, drill, cultivator, crowbar or wheelbarrow. All these artificial appliances are specially committed to us through the reason and intellect with which we are endowed, and in obedience to the command to obtain food by labor.

POISONS FOR INSECTS.—Experiments of late years show the efficiency of poisons for some insects which cannot be reached in any other way. Paris green for the potato bug is everywhere found the only efficient remedy on a large scale. Hellebore for the currant worms, if promptly applied, has always proved successful. More recently hellebore has been used to drive ants from gardens and walks. By sprinkling the powder over their holes, and working it in with a hoe, they are quickly repelled. A mixture of hellebore and flour appears also to have been successful against cucumber bugs and some other insects. Paris green has been used on the canker worm after it has got possession of the trees, by throwing it on mixed with water, by means of a hand engine, early in the season, before there is danger of poisoning the fruit.

LIME DUST.—The following has been recommended as the best mode for preparing lime dust for slugs and other insects, for mildew, &c.: Take say a peck of fresh or sharp lime, broken up into small pieces; then add four pounds of flour of sulphur, or in like proportions if in smaller quantity.

Add one-third as much boiling water, or just enough to slake the lime to dry powder, and cover the vessel as soon as the water is poured on. By adding water it may be made into an excellent whitewash for trees, the sulphur increasing its efficacy.

GATHERING AND STORING TURNIPS.—The long varieties can be quickly gathered by pulling them with both hands, striking them together to knock off the dirt, and laying them *on the row with their crowns in a straight line;* then with a straight edged stalk-knife, the tops can be struck off with great rapidity. I think one man will do as much as two will in any other way that I know of. Select a sloping or dry piece of ground, and gather them into one long heap; cover them with straw to keep out the dirt, and pack the earth on them a foot thick; do not put any soil on the very top, but cover that with a board with holes in it, or old fence posts with the buts off. The holes in the boards or posts will give ventilation, and should be covered with a board to keep out the wet. Should the weather be very severe, long stable manure put on the north side of the heap will keep the frost from going in too deeply. Grade around the heap nicely, so that no water will stand there. Turnips keep better this way than in a cellar, and by using some manure on the heap, can be got with ease at any time.—J. G. W., in COUNTRY GENTLEMAN.

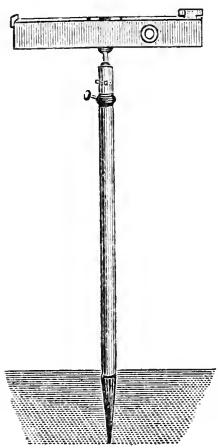


Fig 413.—*Draining Level.*

DRAINING LEVEL.—Mine is a carpenter's level with sights, and a hole in the bottom to fit the stem of a surveyor's compass staff; a set screw on the side of the staff would be almost as convenient. With this level and a rodman I lay off hillside ditches to prevent hilly land in cultivation from washing; drain low land; dig cellars; lay the foundation for houses, and set gate posts. It is also convenient and useful to measure the "cut and fill" in grading roads, and in short for any use on the farm requiring a level or perpendicular. I could not get along without it. The accompanying cut, fig. 413, describes it sufficiently.—A. R. DAVIS, in COUNTRY GENTLEMAN.

POTATO BUGS.—Some curious statements were made in relation to these insects at the Rochester Farmers' Club. Several members said the potato bugs would enter the ground and eat the tubers which were near the surface, after the tops were all devoured. Mr. Crum could not kill them with water nearly boiling; nor could he drown them. Mr. Pierce said they were ten per cent. stronger than Spanish flies, and also that they will fight among themselves with the fierceness and persistence of bulldogs.

A CHEAP REFRIGERATOR.—An inner box is made of yellow pine,

worked 4 inches wide, 1 inch thick, tongued and grooved; 7 feet long, 4 feet high, and 3 feet wide, with two doors in front, and an opening on top for ice-chamber, which is 3 feet by 5 feet 6 inches, and 3 feet high, with two doors in front. Outside of each is the main box, and ice-chamber on top. I put an outer box 4 inches distant all around from inner box, and

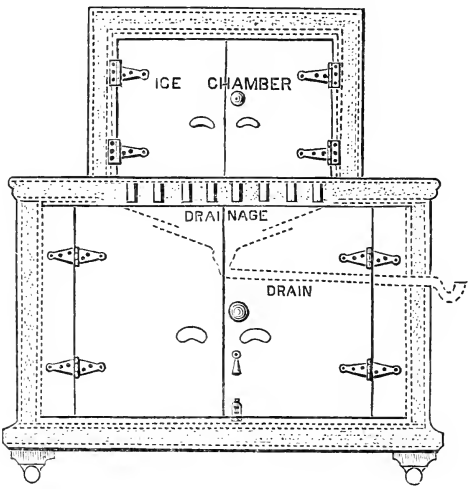


Fig. 414.—*Cheap Refrigerator.*

fill this space between the two with cork shavings, well rammed in. These are a better non-conductor than charcoal, sawdust or any other known material. It is painted inside and out with Prince's metallic paint, two coats, and then lined throughout the inside with zinc, above and below. On the bottom of the main chamber I put a marble slab the whole size of the same. It is very cold. In the ice-chamber put cross-bars near each other to hold the weight of ice, and under them put zinc-covered boards (to run the water into a gutter to be carried outside into a pail), on an incline, leaving an opening from the ice above to the chamber below, thus cooling the contents thereof. All the doors must be filled with cork in the same way as the sides. Use wrought-iron hinges, and have no ventilation. Put slats inside to suit your conveniences of milk, meats, &c. In the refrigerators made by Mr. Lesley, the ice is put in usually about once in each week, and it oftentimes lasts two weeks. The same principle has been applied to storehouses, and country produce, in quantities as received from the cars, is put in until sold.—Correspondent COUNTRY GENTLEMAN.

RENDERING POSTS DURABLE.—As a general rule, we prefer soaking with petroleum wooden structures above ground, and applying hot gas tar

to wood which goes below the surface. The petroleum soaks well into the pores, and gives the wood the character of cedar; but long continued contact with the moisture of the soil tends to abstract or dissipate a part. Gas tar cautiously heated and applied to wood (the best way is to immerse the wood in a kettle of tar), remains mostly at the surface and forms an impervious coating. The most perfect preparation, doubtless, would be to get all the petroleum into the pores of the wood first, and then coat with the tar.

CIDER VINEGAR.—The following is the mode adopted by some who have large orchards, one of whom assured us that his apples were worth three dollars per barrel for this purpose, as he uses only those of fine quality and good flavor: The cider is kept through winter till spring, when the process commences. A supply of the best vinegar in barrels or hogsheads is already on hand as a beginning. These have been kept about half full for many years. About two gallons of the fermented cider are added to each barrel at a time, and in a few days two gallons of the vinegar are withdrawn. The bung is always open, and the cider thoroughly stirred with the vinegar when added. A regular weekly supply of the strongest vinegar is thus obtained through the season. The easiest way is to pump the cider from the cellar below to the vinegar loft above, through a hose pipe. If too much cider is added at a time, it checks the process. We have tried this mode on a small scale with entire success.

PRESERVING TIMBER.—The sleepers or ties of railroads are more exposed to decay than timber in any other position. Their durability is greatly increased, however, by embedding them in gravel with perfect drainage. They will last from twice to three times as long thus protected This shows the importance of providing drainage for fence posts, the portion of which at the surface is nearly as much exposed to decay as railroad sleepers. It appears from observations made in Germany, that after 12 years' service with oak sleepers, it was found necessary to renew three-fourths. When treated with chloride of zinc, less than four per cent. needed renewal in 7 years; impregnated with crude creosote, only one in ten thousand had decayed in 6 years. A correspondent of the Garden has used creosote on his gates and fences with great success; after 6 years all the treated wood is perfectly sound and free from moss or fungus; the untreated portions have already begun to decay, and are covered with moss and lichens. He finds it important to season the wood thoroughly before it is immersed in the tank.

GARDEN USE OF FERTILIZERS.—PETER HENDERSON urges the importance of pulverizing finely and mixing thoroughly with absorbents, all concentrated manures, in order to obtain the best effects. He recommends adding to every bushel of the fertilizer three bushels of leaf mould, pulverized muck, &c., or in their absence common garden soil—the material to be as dry as it can be made. Road dust would be still better.

THE MANAGEMENT OF POULTRY.

Artificial Chicken Raising.

THE FOLLOWING ACCOUNT of the mode used in France has been furnished by Dr. D. E. Salmon, and may interest many of our poultry-raising readers :

Their construction and operation are so simple that I believe almost any one of ordinary ingenuity can make and use them successfully. Fig. 415 represents the incubator, with the drawer containing the eggs partly drawn out. Fig. 416 shows a section of the same. The upper part of the box

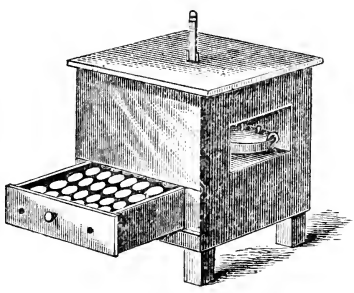


Fig. 415.

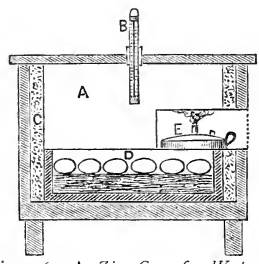


Fig. 416.—A, *Zinc Case for Water*; B, *Thermometer*; C, *Non-conducting Filling*; D, *Drawer, with Eggs*; E, *Lamp*.

contains a zinc reservoir, with a space left, as shown in the drawing, for the introduction of the lamp, and a small tube passing through the top of the box, which serves for filling it with water, and also for holding a thermometer, which, plunged into the water below, indicates the temperature. Thermometer tubes may be obtained, and held in position continually, by inserting through a perforated cork of the proper size ; the temperature of the water may be seen at a glance. The drawer for the eggs is immediately beneath the reservoir ; it is provided with two small holes for ventilation, and holds about forty eggs. A small thermometer is also kept in the drawer to indicate the temperature of the air surrounding the eggs. A space is left around the reservoir, and on three sides of the drawer for a filling of sawdust or other non-conducting material. A flat tin lamp, with two round wicks, is used by the inventor, but I see no reason why one properly constructed kerosene burner would not answer the purpose. A little soft hay is spread in the bottom of the drawer ; the eggs are put in ; it is then closed and warmed by the water above. The temperature of the water is kept at 122°, or enough higher or lower to keep the eggs at 104° to 106°. Once or twice each day the drawer is opened, and the eggs turned and left for a quarter of an hour in the open

air before replacing. At the end of 21 days the chickens come out of the shell without assistance, and are left 24 hours in the drawers, without feed, before being taken to the artificial mother. This operation follows the natural method exactly; the eggs receive their heat from above; they are turned each day, and are ventilated, as is the case when under the mother. The holes for ventilation in the drawer are very small, and probably could be dispensed with without inconvenience, as few will make the drawer fit air-tight.

The artificial mother represented in figs. 417 and 418, is also provided with a zinc reservoir of the shape shown in fig. 418; it is covered below with lamb's skin, in the warm wool of which the chickens nestle and warm themselves. This reservoir is only filled in cold weather, and then only once a day, the water being first heated to a temperature of 169° to 175°. The tube passing up from this reservoir is used for filling, and the one at the side for emptying. The top of the box is of glass, arranged to slide so as to open at pleasure; there are three ventilating holes on each side, and a gate at the end. The chickens are placed in this when 24 hours old, and kept there for a week; they are then gradually habituated to the outside air—the gate being constantly open for them to enter at will. Fresh water and feed are given five times each day, it being considered essential to give only small rations, and to repeat them frequently.

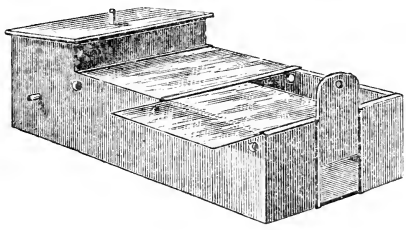


Fig. 417.

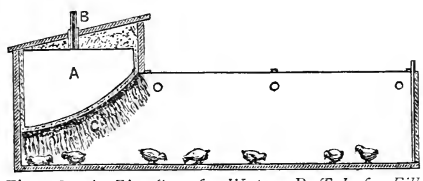


Fig. 418.—A, *Zinc Case for Water*; B, *Tube for Filling*; C, *Lamb's Skin.*

This method of hatching and rearing chickens, which follows nature so closely, is used to a considerable extent in France, and is evidently satisfactory. Its economy in this country depends almost entirely on location. With oil at 13c. to 15c. per gallon, eggs could probably be hatched for about one cent each. There is no trouble with hens leaving their nests, or losing their chickens with poor care; and with the non-sitting breeds the eggs laid during the period of incubation would pay double the cost of hatching a sitting. This of course only applies where eggs are worth 1½c. or 2c. each, and a considerable number of chickens are raised. There can be no doubt that in such cases artificial hatching and rearing would pay well if properly conducted. The method of hatching by means of

fermenting horse manure, advocated by Prof. Corbett, I have never seen in operation, but for very large establishments the plan, or some modification of it, might be found advantageous. On a smaller scale, however, and for all who wish for any reason to hatch artificially with little trouble or expense, I have never seen anything that would compare with the apparatus just described. For hatching high-priced eggs, such as are frequently sold at from 30 to 50 cents each, it would almost invariably pay.

Self-Feeding Hoppers.

The simplest way is to make a box large enough to hold the desired amount of grain, with one side open at the bottom, and having a trough below and in front of the opening, into which the grain will run as fast as it is eaten out by the fowls. Fig. 419 shows this arrangement, with the addition of a false bottom to the box, put in slanting downwards to the front, so that all the grain in the box may be used before it is necessary to replenish it. To prevent the fowls from scratching the grain out from the trough, narrow strips or slats should be nailed across, far enough apart so that the fowls can easily reach the grain, but so near to each other that the hens cannot get in and scratch. The box can be made with a trough on each side, instead of a single one as in the cut.

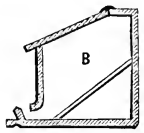


Fig. 419.

In fig. 420 is given a modification of this box, having a cover over the feeding trough to keep out rats, squirrels and mice. There is a cord

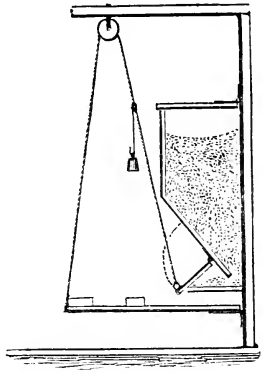


Fig. 420.

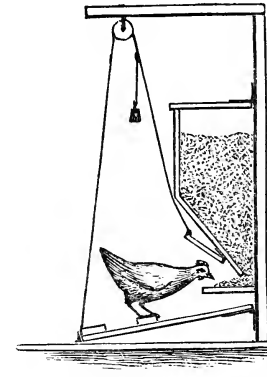


Fig. 421.

fastened to the lower edge of the cover, and passing over a pulley above, is carried down and fastened to the edge of the hinged platform in front of the feeding trough. A weight is attached to this cord, or the cover is made sufficiently heavy, so that it remains closed, except when a fowl steps

upon the hinged platform. When this occurs the platform falls, and the cover is raised from the trough, permitting the hen to eat what she wants. This is clearly shown in fig. 421. The weights can easily be graduated to the size of fowls kept, and the arrangement is so simple that it always works well.

HEN-HOUSE.—The following description of a good hennery is given in the COUNTRY GENTLEMAN by C. L. BAKER of Fayette County, Pa.:

The building is 22 feet long, 8 feet wide, and two stories high. It has a cross partition above and below, making two rooms above and two below, each 8 by 11 feet. The front end, shown in the cut (fig. 422), faces the south. The lower story is mostly sunk below the surface of the ground on the upper side. The north portion has two doors —one at each side near the end, for the lower story, and one at the

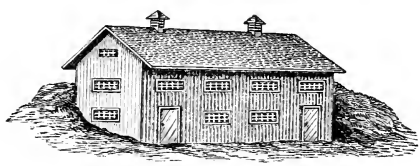


Fig. 422.—*View of Hen-House.*

end for the upper story. The south portion has a door at the side, near the end, from which stairs lead to the upper story. The windows, shown in the view, are 25 by 45 inches, and contain 7 by 9 glass. In the lower story the windows are 20 by 45 inches, and filled with 6 by 8 glass. They are placed between the stringers, and are made to slide. There are no windows on the west side, where the higher ground, nearly reaching to the top of the lower story, gives warm quarters in winter. The upper story is for roosts. The partitions will keep two breeds separate. A stream of water passes through the yards, which is very essential to success in keeping fowls. The yards should be 3 by 6 rods, if you have room.

PREVENTION OF VERMIN ON FOWLS.—A successful poulterer gives the following as sure to prevent loss by gapes or other disease induced by parasitic vermin: Take four ounces of lard and melt in an earthen vessel; add to this half a teaspoonful of common carbolic acid, stirring until cold. When a brood is ready to leave the nest, grease the hen with this mixture, under the wings, between the thighs, and around the vent; also, with the finger, rub a small portion on the top of the head, and along the throat of the chicks, being careful that none gets in the eyes. Carbolic acid mixed with air slaked lime makes a splendid powder for dusting the floor and crevices of the house, destroying vermin and all noxious odors.

For scaly-leg, use half a pint each of common fish oil and kerosene; half an ounce of sulphur and a small quantity of carbolic acid, mixed together. Apply with a small brush twice, allowing two days to intervene between applications.

NOTES IN FRUIT CULTURE.

The Season for Pruning.

IT IS NOW ADMITTED by all who have given attention to the subject, and it is in accordance with both theory and practice, that to favor a free growth of the shoots and leaves, pruning should be performed while trees are dormant or leafless. On the other hand, to check growth, and to promote fruitfulness, the pruning should be done on the tree in leaf and growing. We know of no cultivators who dissent from these truths. It is commonly admitted also that summer pruning favors a more speedy healing of the wounds.

Each season, therefore, has its peculiar advantages. Unless the trees have superabundant vigor, the pruning should not be done after the buds begin to swell. Winter may be better than early spring for hardy trees, by allowing the freshly cut faces to dry and close the sap pores before the commencement of growth. But as cutting away branches always makes trees more susceptible to the effects of cold, the work should not not be performed much before spring on half-tender trees. Pruned at this season of the year, they are not checked in growth, as when the work is done in summer, when the tree must lose a portion of its leaves, and become thus suddenly checked in the performance of its functions.

Pruning in summer, or while the trees are in leaf and growing, may be practiced if they are in vigorous condition, and but a small portion is cut away at a time. There can be no harm at any season in removing a single misplaced shoot. A better way is to rub off needless shoots as they are starting, or to pinch off the ends to prevent extending, as this is not attended with a great loss of leaves. If trees grow too fast to bear, a general pinching over the head, or a summer thinning of the shoots of the whole tree, will tend to induce fruitfulness the second year.

As we have already stated, summer pruning usually favors the more speedy healing of the wounds where limbs of much size are cut off. But experiments do not prove that pruning at this season is always best for the tree. We know of only a single series of trials reported for determining this question, and which were published in 1876 in the Country Gentleman. James Redpath of Iowa cut off a branch from an apple tree in every month of the year, and at the end of five years, when all had healed over, the wood was found least decayed, on cutting into the tree, in those pruned in February and March, and most in those cut in June and July—the latter having healed entirely over one year the soonest. In another similar experiment, all were healed over in four years, with a similar result. The decay from the summer pruning was about three times as great as in winter.

The reason of this increased decay from summer pruning, may perhaps be understood by observing the condition of the wood in both cases. After the leaves, (which continue to pump the sap from the tree as long as they remain) have fallen in autumn, the roots gradually absorb moisture from the soil, and fill the tree with it during winter, causing its copious discharge on the approach of warm weather from such trees as the birch, sugar maple, and other trees, and from grapevines, and a less flow from other trees. If the pruning is done before this discharge commences, so that the sap pores may be closed by drying, the force of the sap will be directed to the remaining branches and buds, without check or derangement. But if the sap current is first allowed to set towards the leaves in branches already growing, the sudden check by amputation deranges the watery currents, and disorder and disease follow so far as the wood is affected, while the flow expends itself in a more speedy formation of wood at the exterior of the wound.

This result suggests a third mode of pruning, a combination of the two already described, and which has been practiced by some cultivators. This is to cut off the limbs intended to be amputated, leaving stumps several inches long, performing the work in winter or before the buds swell, (as shown by the dotted line *a a* in fig. 423,) and then in summer cutting off this stump close to the tree or larger branch, as at *b b*. The object of this mode is to get the full benefit of winter pruning, by avoiding the check of growth produced by heavy summer lopping, and at the same time securing the advantage of a more speedy healing. But it is hardly probable that we shall secure both to their full extent. If many leaves are left on the stump, some injury to the tree will result from their summer removal; while the healing process will doubtless be less rapid than if the whole original foliage of the limb were separated at once. Yet we are disposed to regard this method with favor, as avoiding in some degree both evils.

Fig. 423.

In this connection, we offer a practical hint for the mechanical removal of limbs which require the use of the saw. To prevent splitting the bark on the lower side as the limb falls, first make a small cut beneath and opposite to the main cut made by the saw above; or if they do not quite coincide, let the lower one be slightly nearest the tree. This mode will not only leave a smoother face, but will save time and trouble to the operator, who must otherwise hold the branch with one of his hands or by an assistant. The sawing off of the stumps above mentioned is rapidly and easily done without any such care.

Impressions of Fruit.

First cut the fruit accurately through the centre with a sharp, thin-bladed knife, splitting first the eye and then cutting down and splitting the stem. By a little practice this is done without difficulty or failure. The appearance presented is like that in fig. 424. Then with a pen or camel's-hair pencil, touch lightly the exterior of the cut face with ink, including the stem, to which the ink should be applied more heavily. Then press the whole face on a sheet of thick unsized or blotting paper, taking care that every part comes in contact with it, and pressing the stem down firmly. Then remove it, and a perfect outline will be left. The moisture of the fruit will dilute the ink on its cut face, and a soft, distinct impression will be made (fig. 425), much resembling a neatly shaded picture, if carefully done. A little practice will enable any one possessing a moderate share of skill to make very satisfactory impressions.

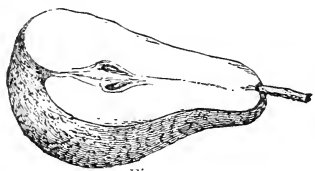


Fig. 424.

Pears which are ripe and melting will have too much water on the cut surface, unless it is first partly absorbed with a sponge, piece of cotton, or with blotting paper, before the ink is applied; and the fresh picture may need some drying by the same means.

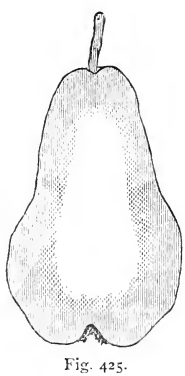


Fig. 425.

In making pictures of apples, or of any fruits which have deep cavities at the ends, the outline, to be complete, must be finished by bridging across these cavities with a single pencil line, by using the eye. Fig. 426 shows the way in which this is done, the dotted lines being those which are added. These lines are often of much importance by way of showing whether the fruit is smooth, even, ribbed, irregular, &c. More perfect and striking pictures may be made by using colored inks, to correspond with the color of the fruit—crimson, orange, yellow, green and scarlet, according to the particular shading of the skin—and when the fruit has a red cheek on a yellow or green skin, each side of the cut surface may be touched with its peculiar hue. Even the red stripes on apples may be imperfectly represented by using some care. The easiest way to apply the colors is to procure a few colored crayons of the softest in market,

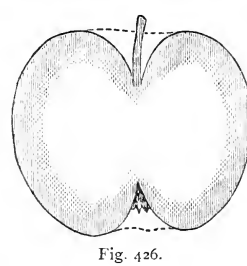


Fig. 426.

and by taking the fruits before they become mellow, the colors may be readily rubbed on the cut edges. In this case the blotting paper should be used.

A good sized book of blotting paper, prepared by the book-binder, may be used for the impressions of all fruits which can be cut through the centre; and such a book, with its yearly additions, will become a volume of much value for reference.

Sulphuring Grapevines.

C. B. Campbell of New-Jersey describes the following contrivance for applying sulphur to his grapevines for destroying mildew:

A convenient method is by the use of a sort of tin *pepper box*, fig. 427, say 10 inches long, 3½ inches in diameter at one end, and tapering to 1½ inches at the other. The larger end is soldered tightly, but perforated in the usual way, to admit a free passage of the powder or sulphur. The smaller end is open and is closed with a cap when in use. The cap should be 2½ inches long, with a ring soldered on the side to receive the finger to hold it on. This box is used for dusting the vines the first time, about the blossoming season.

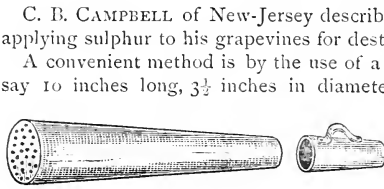


Fig. 427.

When the foliage is fully out, and dusting is to be done more extensively, the common sulphur bellows is used, but the objection to this is that too much time is required to go over a vineyard; besides a much cheaper apparatus is easily made—a tin box 3 inches deep, 4 inches in diameter (or square) at the top, and 6 inches in diameter (or square) at the bottom, can

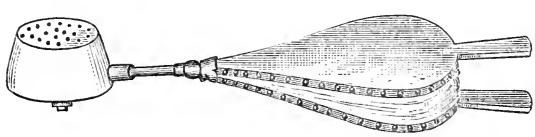


Fig. 428.

be fastened to a common fire bellows, the pipe entering the box on one side near the bottom, through a short tube or socket, and the whole made firm (fig. 428.) The top of the box is perforated as usual, and the bottom has an inch and a half aperture to receive the sulphur, which is closed with a cork when in use, the cork being inserted in a short tube or socket soldered in. The apparatus can be easily made by any tinman, and used with any old-fashioned fire-place bellows. With it, an acre of vines can be dusted in two or three hours. It is well to put into either of these boxes three or four good sized gravel stones, or an equivalent, to fine up the sulphur and prevent clogging.

Care should be taken to protect the lungs from the sulphur, by muffling

the mouth and the nostrils with flannel, and some will find goggles necessary to protect the eyes. Keep to the windward side of the vines.

GEO. W. CAMPBELL thinks the sulphur remedy for out-door grapes may be relied on greatly to lessen, if not entirely prevent, attacks of mildew. He has used it for many years on the Delaware, and on nearly all varieties subject to mildew and rot, and always with apparent success when timely and persistently applied. He commonly uses the sulphur in connection with freshly slaked quicklime—the latter to prevent the bellows, through which it is blown, from becoming clogged by the sulphur.

Mr. BATEHAM has confidence in sulphur, and applies it early and often; the first time as soon as the fruit is set, or earlier, repeating every two weeks until it is nearly ripe.

MISCELLANEOUS NOTES AND SUGGESTIONS.

LIQUID GRAFTING-WAX.—The following ingredients are recommended by some authorities: A pound each of rosin and tallow melted together; cool and add a spoonful of turpentine; add further four ounces of alcohol, and two ounces of water; heating again and stirring briskly. It should be about equal in consistency to honey; if not, add a little more alcohol, and a smaller quantity of turpentine. Keep in a bottle and apply with a brush, the cork forming the handle, as shown in fig. 429. It is a good application for wounds made in pruning.

Fig. 429

CULTIVATION OF ORCHARDS.—Prof. BEAL says he has never seen or heard of an apple orchard injured by too frequent culture, but admits that in some of the States it may not be necessary after the trees have become well grown and established. When to cultivate or not, he remarks, depends on several conditions. If the color of the leaves is good, and the growth good, and the trees bear well of fine fruit, they are doing well enough even if in grass. But if the leaves are pale, the growth of the annual twigs much less than a foot in length on trees set twelve years, and the fruit small and poor, something is the matter, and they are suffering for want of the plow, harrow or cultivator, or a heavy mulch or coat of manure.

DRAINAGE OF FRUIT LAND.—The Gardener's Chronicle relates an instance of one who planted apples, pears and cherries upon heavy clay—trenching it down to an iron hard pan. The trees made no growth, lichens grew upon them, and they seemed about to die, when the orchard was thoroughly drained. In six months the lichens began to disappear. The succeeding season a large growth was made, and the orchard became vigorous—all because of the warming of the soil incident to the drainage.

The importance of a dry bottom to vineyards was shown us on a visit to a vineyard on the Hudson. A portion of it had been planted on sloping wet ground, and did not succeed well. A tile drain three feet deep was then placed midway between the trellises, and it became an excellent vineyard.

DEFECTIVE POLLEN.—The Rural New-Yorker gives an account of an experiment to ascertain the importance of the pollen on young fruit trees that blossom for the first time, or in the first year of blooming. A young cherry tree bore blossoms but no fruit. When it blossomed the second year, pollen was applied from an old cherry tree to the stigmas of certain marked flowers. These alone formed and ripened fruit. This experiment suggests a shorter mode of obtaining fruit from young trees of new sorts.

BARK LOUSE.—C. V. Riley, in Colman's Rural World, says that the oyster-shell bark-louse may be destroyed in spring just after hatching, by the applicatiou of alkaline washes, such as lye, soapsuds, or whitewash, and that the eggs under the scales may be killed during winter by washing or syringing the trees with coal oil, diluted with three parts of water. Prevention, by an examination of all infested trees before planting, is particularly recommended.

PROFITABLE ORCHARDS.—The Rural Home describes the apple orchards in Parma, Monroe Co., N. Y., showing the profitable character of the business in that favorable locality, on the south borders of Lake Ontario, and north of the city of Rochester. Among others, the orchard of John Collamer is mentioned, which contains 1,100 trees, mostly of the Baldwin and Twenty Ounce. From this orchard $3,000 worth of fruit was sold in 1876, the price being rather high at that time. Another farmer by the name of Tinney, has two acres of the Bartlett pear, barren sometimes, but the annual crop from which has averaged from $500 to $700. John Tinney, a son, has 1,400 bearing apple trees. From his Twenty Ounce trees alone he sold 700 barrels in 1876. All these orchards are well cultivated; that of Mr. Collamer without any other crop.

THINNING FRUIT.—Additional facts come before us every year showing the importance of thinning fruit on the trees early in the season. E. Moody of Lockport stated some years ago that while the large, handsome peaches on his thinned trees brought $1.50 per basket, the same sorts on crowded branches sold for only 50 cents. More recently Mr. Dyckman of White Haven has cited instances where his thinned crop readily brought $2.50 per basket and the unthinned brought only $1.25. There is less difference when the trees are young and bear large specimens, but as they become older and more productive, the difference becomes very distinct.

But the increased price is not the only advantage. An overloaded tree is soon exhausted. A large orchardist in Ohio lost his 3,000 trees by the cold of winter, after a very heavy crop; while trees which had not borne were uninjured. We had a fine plum orchard nearly ruined some years

ago in the same way, after several very heavy and unthinned crops, resulting from a thorough destruction of the curculio. It is much easier to thin out poor specimens early than to hand pick all, and then assort them.

A writer in the Practical Farmer mentions the practice of a neighbor who keeps his crop of apples properly thinned by pruning, preventing the dense mass of shoots often seen, and the profuse crop of fruit on them of small size and poor quality. This neighbor's apples are fully twice as large as most of the specimens grown elsewhere and of fine appearance and flavor. Now he does not adopt the common practice of waiting till the tops of the trees become a mass of brush, and then thin this out, but he begins as soon as the young trees are set out, reduces the branches, places them at regular distances, and keeps the heads properly thinned by *preventing* a thick growth.

A. S. Dyckman, who has extensive peach orchards at South Haven, Mich., gives the horticultural society of that place the following account, in substance, of his mode of thinning the crop: A part of the thinning is effected by pruning, when this is needed. The cost is about five cents per bushel, and the market price is often doubled by the operation. The rule is to leave one peach on a shoot six inches long, and two on a limb a foot long. Make the spaces between them as even as practicable. For this purpose it is often necessary to remove nine-tenths. Finish one branch at a time; work from the centre of the tree. It saves labor at the regular picking, assorting and packing. Another important advantage is in preventing the exhaustion of the trees. The work is done soon after the fruit sets.

Close Summer Pruning.—A correspondent of the Fruit Recorder gives an account of an experiment where he pruned back the new fruit-bearing shoots when a foot long, and as a consequence the grapes on these shoots were not half as large as the grapes on vines that were allowed a free growth. To grow and mature well, the fruit must be fed from a sufficient number of good, well-developed leaves, most of which were removed or prevented by the close pruning.

Apples for Maine.—We observe among the sorts which took premiums at the third annual exhibition, as indicating those most popular in that State, the following: Gravenstein, Tompkins County King, Sops of Wine, Jewett's Fine Red, Winthrop Greening, Roxbury Russet, Golden Ball, Duchess of Oldenburg, Fall Harvey, Hubbardston Nonesuch, Porter, Yellow Belleflower, Tallman Sweet, Baldwin.

Apples for Missouri.—Colman's Rural World gives the following list after examining and testing a large number, as the very best for carrying a supply through autumn, winter and spring: Rome Beauty, Smith's Cider, Jonathan, Rambo, Winesap, Ben Davis and Rawle's Janet. In addition to these, Baldwin, Esopus Spitzenburgh and American Golden Russet are fine, but do not yield so full a crop.

SORTING APPLES.—Prof. J. W. Beal of the Michigan State Agricultural College, Lansing, says a very good way to manage the sorting of apples into grades, where there are several pickers, is to have a cushioned box holding a couple of bushels, placed upon movable wooden horses. The pickers turn the fruit carefully into the padded box, and one can sort and grade for several that are picking. It pays most emphatically to place upon the market only the very best, and sorting carefully becomes a necessity.

BURYING APPLES.—The practice of burying apples to keep during the winter, if the proper conditions are observed, does well, and in those districts of the country where the crop is larger than the cellars of the owners, it may be profitably resorted to. The first requisite is to select only good keepers, that usually last through winter. Secondly, choose a very dry piece of ground, where there is a natural drainage; and better if under the shelter of evergreen trees. Instead of placing the apples on the bare ground, first lay a thin stratum of stiff rye straw, corn husks or soft evergreen branches, which will keep the fruit comparatively dry, without excluding the warmth from below. On this stratum place a heap of apples, and then cover them with plenty of straw, which will be 8 or 10 inches thick when packed. Three inches of earth outside of this will protect them from freezing. Turf makes an excellent covering, and 6 inches of dry forest leaves, instead of straw, will answer an excellent purpose. Apples do not need so much protection as potatoes. There should be a ventilating hole at the top, filled loosely with straw, or the heated air collecting there will make many rotten apples at the apex of the heap.

STOCKS FOR DWARF PEARS.—Many years ago Ellwanger & Barry of Rochester had a very fine and promising orchard of dwarf Doyenne pears. Just as it had fairly come into bearing, the black mildew or scab began to attack it, in common with nearly all other trees of this sort in Western New-York, and when no hope appeared for improvement, they worked these trees over to the Duchesse d'Angouleme and some other sorts. By inserting many grafts into different parts of each tree, towards the stem or centre, the entire change to good bearing trees was effected in two or three years. This was done many years ago, and the trees are now among their best and most valuable dwarfs. They recently expressed their opinion that there is no stock for dwarfs equal to that of the Doyenne, on which these double-worked trees grow.

PRUNING DWARF PEARS.—The successful culture of dwarf pears depends on four essential requisites, namely—1. A locality where they are found to succeed, for in some places they fail, although this failure is sometimes attributed to unfavorable locality, when it is more the result of neglect. 2. Good cultivation and annual enriching of the soil, especially at the North and East. Where the soil is naturally fertile and the summers hot, less cultivation and manuring are necessary. 3. Pruning, to prevent

too many fruit spurs, and to favor a growth of vigorous shoots. 4. The selection of such varieties only as grow freely on the quince, as Duchesse d'Angouleme, which is the hardiest and most enduring; Louise Bonne of Jersey, Doyenne Boussock, Beurre Superfin, &c. In severe climates, mulching for winter is important and essential, and is useful everywhere.

Heading-in Peach Trees.—A. C. Younglove of Vine Valley, N. Y., finds it unprofitable to cut back the young shoots of peach trees every year. He allows the tree to grow four or five years, and then cuts back large limbs early in spring. New shoots spring out, and the size and quality of the fruit are greatly improved. It is important, of course, to do this work right, and not blindly and blunderingly.

Plums for Market.—G. Ellwanger gives the following list as the most profitable market plums: Bradshaw, Coe's Golden Drop, Fellenberg, Lombard, Yellow Egg, McLaughlin, Peter's Yellow Gage, Reine Claude de Bavay, Shropshire Damson, Victoria. For drying—Fellenberg, German Prune, Prune d'Agen, Wangenheim.

Grapes at Montreal.—The Report of the Fruit Committee of the Montreal Horticultural Society gives the following rules for the management of grapes in that climate:

1. Ground thoroughly underdrained.

2. Well pulverized garden soil; the richer the better.

3. A southern exposure, where the full benefit of the morning sun may be had. Fruit will ripen at least a week sooner, if grown against a wall or fence. Protection by means of a belt of trees or fence, against the cold north or east winds, is a great safeguard in our northern climate.

4. A covering of from 4 to 6 inches of earth or other material, in winter.

5. Constant, but not severe pruning; a certain amount of pruning being requisite to bring fruit to perfection.

The renewal system (*i. e.*, that a cane should be allowed to grow to replace the fruit-growing cane of the same season, which is cut out in the fall) has proved the most successful.

6. That the vine should not be allowed to overbear, which under good cultivation it is sure to do; the consequences being seriously felt in succeeding years.

Long Keeping Grapes.—The sorts which have thin and tender skins, like the Concord, do not keep well; but thick and tough-skinned grapes, like the Diana, remain fresh a long time, if in a dry, cold room. The old Isabella is well known as a good keeper, so is the Catawba, the Walter, and thick-skinned Rogers' hybrids; as for example, the Wilder. All sorts keep best if well grown and fully ripened on well pruned and well cultivated vines, so as to give them a rich juice. Poorly grown and watery, they soon spoil.

Packing Grapes.—A successful shipper gives the following as his method of picking and packing, when large boxes are used, and not the small fancy boxes, although the same general directions will apply to both:

Gather the grapes only in dry weather, cutting the stalk with a sharp knife; remove carefully all defective berries from each bunch, taking special care not to rub off any of the bloom, as on this precaution depends greatly their appearance in market. A shallow hand basket may be used to receive them. Carry them to the packing room, tip the boxes with a blocking slightly towards you, and lay the bunches in, one at a time, carefully, so as to fit well together, in regular layers, making an even top without cutting bunches, and with stems under and concealed. This will require some skill and practice. They should stand several hours before the cover is placed on them, and the box should be full enough for the surface at the top to project an inch or more above the rim, so that when the cover is pressed down to its place, their elasticity may keep them compactly together without rattling in carrying. We have seen grapes utterly ruined by not being packed compactly to prevent rattling.

PLANTING STRAWBERRIES.—Wm. Parry, who has been so successful in the culture of small fruits, adopts the following course as a good one, in setting out strawberry plants: He plows furrows two and a half feet apart, and spreads along them a mixture of equal parts of muck, marl, ashes and ground bone. They are to be mixed a fortnight before using. Three-fourths of a ton of this mixture per acre, gives a luxuriant growth to the plants. This result might not be so successful on all soils. These rows are cultivated with a horse. He finds a good coat of stable manure just before winter, of great importance.

AUTUMN SETTING STRAWBERRIES.—P. T. Quinn says that strawberries may be set in September, if the following conditions be observed, namely, a rich soil, deep and mellow; strong plants of the same season's growth, with plenty of healthy roots; damp weather at transplanting, or if dry, successive waterings; and mulching with yard manure before cold weather sets in. To which we would add, that if the soil is strong or inclined to be clayey, it should be trodden compactly over the roots and left a little convex, to throw off water and prevent heaving by frost. We have never found transplanting to succeed well after August, and if the weather is dry in that month, the difficulty may be fully remedied by cutting off the larger and older leaves, and mulching with manure an inch and a half thick, which will hold the moisture of watering, and permit successive waterings afterwards without hardening or crusting the surface. Large plantations are to be set in spring, when the work is more easily and safely done.

SUMMER FALLOWING FOR STRAWBERRIES.—A successful cultivator says it will pay to summer fallow preceding the planting of strawberries, to get rid of all the weeds, even if it has to be done all the season through. Much will depend, however, on the frequency of the stirring. It should be done as often as a new set of seeds, turned up near the surface, break into sprouts. Plowing or harrowing every week or two will accomplish more in six weeks in warm weather than the whole six months with a few stirrings.

A GOOD BRIER PATCH.—The most profitable plantation of blackberries which we have met with, was growing in New-Jersey, in 1875, a few miles from Philadelphia. It covered densely seventy-five well cultivated acres. On the day of our visit there were 260 persons at work gathering the berries, which were Wilson's Early. On inquiring of the owner what his sales were, he replied, "We have a slight crop this year—not much over half of one, and our sales will not exceed over $15,000. Last year we had a good crop, and sold $22,000 worth." As an indication that the soil was admirably adapted to the blackberry the wild bushes growing at the roadsides in the neighborhood were loaded with berries.

PROFITABLE RASPBERRIES.—The Burlington County (N. J.) Agricultural Society awarded to Wm. Parry the premium for raspberries, on his ten acres of the Brandywine, which yielded 26,300 quarts—over 82 bushels per acre—affording a net profit of $280 per acre. The gross sales were $4,338; expenses, $1,538. Hair manure only was used, at a cost of $10 per acre.

PLANTING RASPBERRIES.—Wm. Parry gives, in substance, the following directions for making new plantations: Select a well-drained soil, enrich it early in autumn or cover with manure and fertilizers; plow and prepare well, and open deep furrows 6 feet apart for the rows, in autumn. Spread muck copiously in the furrows during winter. As early in spring as practicable, set the young plants along the rows on the muck, 2 feet apart. Cover the roots with a small plow, going once around each row. Tread firmly around each plant while holding it upright, cutting each stem off near the ground. Potatoes or other vegetables may be grown the first year between the rows, after which they will need the whole occupancy of the ground.

The following is the substance of the directions for raising raspberries from cuttings of the roots, given by Mr. Parry, which may be adopted when rapid propagation is needed, or large quantities required: In the autumn, after the leaves have fallen, dig up the plants with all the roots that can be secured. Cut the roots into pieces about two inches long, and pack them in a box with damp moss, or clean, coarse sand, or damp sawdust. The bottom of the box is to be sprinkled with this material, and then alternating layers of this and the cuttings fill the box. Put this box in the cellar. The cuttings must not be allowed to become dry, although a slight moisture is sufficient. In a few weeks the cuttings will have formed buds and calluses. They are set out in open ground.

SETTING GREEN RASPBERRY PLANTS.—The Fruit Recorder describes the process, now well known, of transplanting young raspberries, when only six or seven inches high, and in full growth, in the early part of summer. The work is as safely performed as setting tomato plants, and they make a fine growth the same season. Take a pail to hold the plants while digging them; take up with a fork, so as to save a large part of the cross roots; mud the roots, well, and set out near evening, or on

a cloudy day. The mudded roots, packed in moss, may be sent long distances by express.

The same paper gives the most successful planting of raspberries as in autumn, by the following mode: The young plants were carefully set, the roots well spread out, and the mellow earth which covered them, beaten with the hoe over the plants, to show where they were. As soon as the ground froze in winter, a wagon load of manure was driven over the plantation, and a shovelful placed on each beaten spot. Early in spring the whole surface was harrowed, which scattered the manure and mixed it with the soil. This mellowed the soil and destroyed the weeds that were just ready to come up, leaving a clean surface till the young raspberries were half a foot high.

HOT-BEDS.—The Fruit Recorder thinks the best manure for hot-beds is a mixture of forest leaves and stable manure; and that the best way to obtain this mixture is to use leaves to litter the stables in winter.

ROAD MAKING.

THE PUBLIC ROADS in the United States have cost several hundred million dollars; and keeping them in repairs an expenditure of many millions. They are worth to the people much more than they have cost, for without them, and deprived of the advantage of market and many other facilities, the present state of business, and the present population could not exist. An immense loss is sustained by the bad quality of the roads, where they might, without difficulty, be much better. Farmers generally do not sufficiently appreciate the importance and value of good thoroughfares; the fact that a farm will sell at a much higher price when adjoining a fine, smooth highway, than on a muddy and impassable one, should convince any one of their great value.

It is not necessary, in ordinary practice, to resort to the high-priced Macadam mode of construction, or even the cheaper and equally good Telford road. Their advantages away from towns or heavy travel would not warrant the outlay. But a great deal may be done by making a wise use of the materials at hand. A considerable portion of the soil of the country at large is composed of ingredients, which form good road beds, as for example when it consists largely of fine gravel, with a natural underdrainage. Little more labor is needed with such soils than to make a smooth surface, and to provide the necessary bridges.

But most of our soils are not so favorable to good road-making. They contain enough clay or other soft material to work up into mud after every heavy rain. They are without natural drainage, and this mud, when once worked up, is often retained on the surface a long time, because there is no way for the water to escape, except by natural evaporation. The two

great requisites, therefore, in the construction of most of our public roads is—1. To use the best material which the soil or subsoil affords. 2. To provide ample drainage beneath them.

1. THE MATERIALS.—In many places the surface soil, for several inches or a foot in depth, is a rich, friable loam, often containing a good deal of vegetable matter, which proves excellent for growing a crop of corn or potatoes, but which is easily worked into mud by the feet of traveling horses, or cut into deep ruts by the passing of heavy wheels. Below this soft surface is a hard subsoil, which withstands the beating of the feet or the roll of the wheels. Some specimens of bad road-making have shown the great superiority of the under material. In one case a high "turnpike," or raised road-bed, was made by plowing the black and rich soil on each side, and scraping it into a high and broad ridge at the centre, on which heavy wagons and light carriages were expected to run. In making this road-bed of rich muck, a strip of hard subsoil was laid bare on each side, forming a broad ditch. It was amusing as well as instructive, to see the very men who constructed this road, when the time came that the oft "turnpike" was cut a foot deep with ruts in wet weather, resorting to the smooth, hard, denuded surface of the subsoil on each side, in drawing their grain to market. They did not, however, accept the lesson thus taught them, but continued in after years in the same practice of heaping up soft surface earth and sods to make into public highways. Such a road is rep-

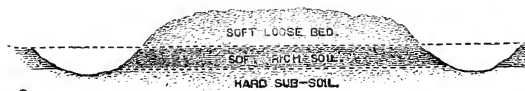


Fig. 430.—*Cross-Section of Soft Road-Bed.*

resented in cross-section by fig. 430. The soft surface soil is plowed up and scraped towards the centre of the roadway on other soft earth, as a foundation—which is indeed not so good as the sandy foundation on which the foolish man built his house, for sand would be better than this muck. The next plowing and scraping goes a little deeper, but does not reach the hard subsoil. With this the road is completed ; and with the double quantity of soft material thus heaped up, is not so good as the original surface, except so far as shallow ditches may have been made on each side. (The dotted lines show the natural surface and the depth of the soft soil.)

Fig. 431.

After a long series of early spring rains, it is not very unusual to see such roads cut into regular and parallel lines of deep ruts, extending mile after mile, a cross-section of which is imperfectly represented by fig. 431.

Some improvement on this mode is effected by going deeper, so as to

bring up a portion of the hard earth below, and with it facing the top of the muck bed, and with good ditches at the sides, as shown by cross-section in fig. 432. For light vehicles, this does very well, as they pass

Fig. 432.—*Bed of Muck Faced with Hard-pan.*

lightly over the trembling surface, without disturbing the deep soft bed below. Not so with 50 or 60 bushels of wheat on the heavy farm wagon. When the top becomes softened by water, the wheels grind through, and it is hard to say where they will be likely to bring up—probably at a slightly greater depth than the ruts shown in fig. 431.

Such results as here described naturally suggest a different mode of making roads with such soils; and if a regular system is adopted, it may be accomplished with comparatively small expense, with excellent and durable results. First scrape the rich top soil on the adjacent fields, or use it for compost heaps, especially if largely of turf. Then make shallow ditches on each side of a smooth central road-bed, as shown in fig. 433. When once well finished, it will need almost no repairs for many years. The

Fig. 433.—*Road of Hard Subsoil.*

hard material will remain there. The interest on the cost of making the road will be less than the yearly cost commonly expended on muck-beds.

This treatment will not answer for all soils. The management must be varied more or less with circumstances, the road-maker using his judgement. This practice is described as a specimen of the use of good material and the rejection of bad.

2. DRAINAGE.—This is always useful, and should never be omitted in any instance, and especially with a costly stone or gravel road. It will often convert a muddy road into a dry one, other things being the same. Any one may be easily satisfied on this point if he will remember that a muddy road becomes good in dry summer weather. If roads could be always kept dry, much of the trouble would be obviated.

Open drains cannot be made deep, and they ought never to be so deep as to prove dangerous in case of running too far to one side. They are useful only in carrying off surface water. A sloping bank, to retain its position, cannot well be steeper than with a rise of one foot to a foot and a half horizontally. An open ditch, therefore, only a foot deep and two feet wide on the bottom, must be five feet wide at the top. Two feet deep would require a width of ten feet. It would be better that road ditches have less steepness.

To effect proper drainage to a road, it must be provided with tile or

covered drains. These indeed are much cheaper than open ditches for all except surface water. One good tile drain running lengthwise with the road, and under the centre of the wagon track, would often effect wonders. It should be covered with broken stone or coarse gravel nearly or quite to the surface, with finer gravel at the top. Two, or even three, such drains, parallel and a few feet apart, would be still more effectual. At every low place, outlets should be provided for them. They need not cost over $300 a mile where materials are at hand. The interest on this sum is less than the cost of the labor often expended annually towards keeping a common road in bad repair.

IMPROVEMENT IN DOMESTIC ANIMALS.

By Mason C. Weld.

IN THE COURSE OF AGES those classes of animals which we most naturally regard as included in the term "domestic animals," have become more and more adapted to the needs of civilized man, and it is his profitable privilege to maintain them so, and to improve them, if he can, by breeding them nearer and nearer to such standards of perfection as seem to combine the most value. To this end associations have been formed, *standards* have been determined upon, *scales of points* made out, agricultural societies offer *prizes*, and *books* almost without number have been written, and more than all, and earlier than all, the *pedigree* was recognized as the most important of all means of permanent improvement.

In civilized society the generality of men violate in their own lives so thoroughly all the principles and practices of correct breeding that it is hardly to be wondered at that they are careless about their cattle—great and small.

A pedigree is never valueless if only it be truthful, and its value depends upon the fact that the young are likely to resemble their parents in important respects, and also that after a succession of generations in which particular characteristics are prominent or peculiarly developed, the tendency to reproduce the same in subsequent generations is greatly strengthened. This tendency is modified by natural laws, and it is found that animals, in whose breeding there has been a great departure from the normal type, possess an increasing tendency to revert towards some original or earlier form. Indiscretion in breeding, especially holding too closely to particular characteristics, may and does induce constitutional weakness, shortness of life, liability to disease, &c. Thus are we hemmed in with difficulties and forced to breed with an intelligent regard for

the laws of health. The breeder's aim is to improve his stock in the development of valuable qualities, and at the same time not to impair their constitutions. The value of honestly kept public records of pedigrees published periodically, and called "Stud Books" and "Herd Books," is therefore very great.

Among the breeds of domestic animals those are the most fixed in type and most permanent in character, soundest in health, and, as a rule, the hardiest, with the formation of which man has had least to do.

Breeds of Horses.

Compared with other races of horses, the Arabian holds a pre-eminence which none can deny. We have no evidence that he owes any of his good qualities to man, except indeed his docility, and even that may arise from his intelligence in freely acknowledging man as the superior animal, and a readiness to accept the situation as his familiar servant and trusted friend.

The habits of the horse in a wild state are exactly calculated to develop those qualities for which he is most valuable and useful. He seeks safety in flight; as a rule would rather run than fight. His food is close, sweet herbage, which necessitates much travel and often long journeys for pasturage and water. Among themselves supremacy is mantained by the leaders of herds through the use of their teeth and heels, and most terrible fighters they are when aroused. Wild horses develop, therefore, naturally speed, endurance, hardiness, strength, wind and soundness in every particular, because by these qualities the race is maintained. And no doubt it is because the Arabians use the horse in ways so closely agreeing with his natural instincts and tendencies, and at the same time, by furnishing superior food, by keeping pedigrees with great care, and studying them, or rather perhaps following sage maxims, they have preserved the original race unimpaired, and have possibly improved upon it.

The number of horses in the United States by the last census was 7,145,370. America had originally no horses native to her soil; but in Europe, Asia, and Northern Africa various breeds existed, which were modified by climatic influences, and by the demands of man. They were used for the chase, as beasts of burden, for draft and for war, and have undergone changes according to the systems of breeding, training and use to which they have been subjected.

The American Trotting Horse is rapidly gaining at least one of the distinctive characteristics of a breed. Through the crudest system of breeding, neglect of pedigrees, and false reasoning, combined however with unprecedented shrewdness in selection, and tact in training trotters, we came to be possessed of a great number of excellent trotting horses, and among them several sires which imparted their trotting powers strongly to their offspring. This occurred at a time just previous to and during a period of great commercial prosperity, when money was plenty, and when

the luxury of a fast road horse could be indulged in by a very large number of persons. The result was that speed in a horse, whether already developed or presumably latent, was paid for most liberally. Style, form, soundness, and even bottom, were secondary considerations.

Following the gradual contraction of currency which has taken place, a period of commercial depression has come. Where one hundred men could own roadsters, and even trained trotting horses, a few years ago, perhaps five can do so now; hence the primarily useful horse again comes to the front, and a selection is made of those combining the good qualities of speed, bottom, constitution and pedigree, for breeding purposes, brought about by the necessities of the times; this bodes well for the future.

It is a subject for congratulation that we have now, through the perseverance of a few individuals, much accurate knowledge of the pedigrees of our trotting stock, and that our prominent breeders, who are now really worthy of the name, are pursuing definite and generally reasonable systems in the place of the wild, hap-hazard breeding which prevailed a few years ago. The result is that speed is increasing. There are more very speedy horses, and a few show better speed than was even deemed possible. Nothing shows this better than the classification of horses for races. Purses are now offered to be competed for by horses that have not trotted in "better than 2:19," whereas a few years ago the "2:23 class" was the lowest, and horses which had records of having trotted a mile in less than two minutes and twenty-three seconds were, of course, in the "open for all" class. Thus the "time allowance" has gradually been shortened within the recollection of all from two minutes and thirty seconds. The most important result reached is, however, the establishment of the indisputable fact that speed may be bred—that certain combinations of blood are almost certain, and on an average certain to give extraordinary speed with a natural trotting action.

Draft Horses.—While this great improvement of our trotting stock has been going on, the breeders of draft horses have not been idle. The two best breeds of draft horses in the world, those of Scotland and of France, have been freely drawn upon. The number of importations of Clydesdale horses, chiefly stallions of notable excellence, must exceed two hundred, while the number of Percherons imported will certainly reach twelve hundred. These are increasing the weight, symmetry and power of our draft horses greatly, which may be observed especially in the class of horses used for draft in all our principal cities. The French Norman blood seems best adapted to our uses, and of this there are two rather distinct types, the Percheron and the greater Norman. The two are so mingled in France that much confusion exists, and the French utterly ignore pedigrees. In this country they are carefully kept. Those of the Percheron type are smaller, more active, exceedingly muscular and powerful, having good trotting action, fast walkers, weighing 1,250 to 1,600 pounds. The Normans will weigh 1,700 to 2,000 pounds, have similar characteristics of

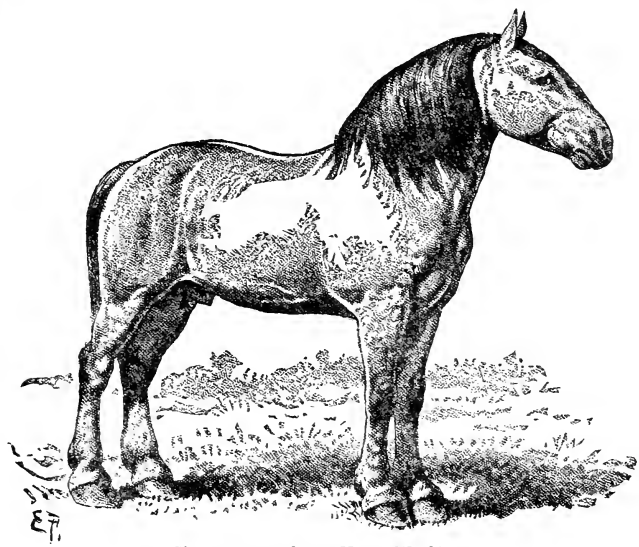


Fig. 434.—*Percheron Horse Washington.*

a lower degree—that is, walk well, trot finely, are docile, powerful and well formed.

The accompanying engraving (fig. 434) is a copy of a photograph of "Washington," imported by J. J. Parker of Westchester, Pa. It exhibits well the characteristics of the breed. The foreshortening, as in most photographs, enlarges slightly the head and forequarters.

Breeds of Neat Cattle.

It is altogether probable that the number of neat cattle in this country has never increased so rapidly as since the taking of the last census (1870), in which they are stated as numbering 23,820,608. The very recent trade in fresh beef and beef cattle with Great Britain gives additional importance to everything connected with their breeding. Common cattle mingle and breed freely with the zebu, the yak, the bison, and it is said with several other apparently distinct species. Of course this blending of blood indicates possibilities in breeding peculiar forms and habitudes, adapted for specific uses, which is almost bewildering. At the same time it suggests a way of accounting for the great variations among the races and breeds of the species, *Bos taurus*.

This is an interesting subject for the naturalist, but for the farmer it has only a general value. We have here half-a-dozen well defined breeds, all derived from Europe, most of them from Great Britain. Others there are

indeed among us, but they are in small numbers, and we would be quite as well off agriculturally without them. We will consider them briefly in the order of their intrinsic merit.

SHORT-HORNS.—The improved Short-Horns have been carefully bred for about 150 years. From the first, or soon after the first successful efforts towards their improvement were made, pedigrees have been kept and regarded as the basis of all improvement. Animals which improved their own qualities upon their progeny were sought after and bred to if males, or cherished if females, their progeny being closely bred together, or to their sires. Thus, in the most famous lines, a constant crossing and blending of kindred blood takes place which makes a maze of relationships, and would set a "garter king at arms" crazy if he had to blazon a shield with such "quarterings" and "differences," for a human princess or duchess, as are called for by one of the Short-Horn pedigrees.

It is not likely that essential improvement has been made in the forms of Short-Horns within 60 or 70 years. A few animals existed then which were accepted as near the standards of perfection—these standards being based upon primarily useful points, especially upon beef points, and the breed has been propagated with these characteristics in view. As a result, we find more animals approaching that criterion of excellence than ever before. At the same time there are more animals bought and sold on pedigree alone. This tendency unduly to exalt pedigree above form, constitution and reproductive vigor works its own cure through the disappearance of those families too long and too closely bred, while cognate blood into which fresh strains have been poured will remain vigorous and useful.

We observe, as the fundamental fact in Short-Horn breeding, that close in-and-in breeding produces that property of improving its own qualities which is characteristic of thoroughbreds; while in mating males with females of less force and intensity of organization, as shown by their pedigrees, although they may be of the same general breeding, results are obtained in which the combined excellencies of the parent stocks are measurably free from constitutional defects. Similar results are seen when any well bred bulls are used with common cows, and, indeed, thoroughbred or well bred males with any scrub or inferior females. In such cases we may look for results by no means intermediate between the two combined stocks, but in useful points the grade animal is often the superior to the full blood. This is, however, rarely or never the case when other than full-blooded males are used as sires. So it occurs that in taking out-crosses to give constitution, the great improvement is seen in the first generation, recourse being subsequently had to bulls of purest pedigree.

The Short-Horn breeder must therefore be a student of pedigrees, not only that he may see the course of breeding followed with success by those who have gone before him, but to know what the blood of his own stock is; what related families exist with which favorable crosses may be effected; what out-crosses may from time to time be taken with success, and what

should be avoided. It involves a study of points also, and of constitutional tendencies, of the credibility of records, and of individual breeders. The fact that a breeder, or one whose name stands recorded in the pedigree of an animal, is or was a man of jockeying proclivities, is a stain upon the pedigree, and will so remain forever. It is fortunate that both in England and America there are few such names defacing the herd-books. It is in vain the cow jockey covers his tracks, his character will be suspected if

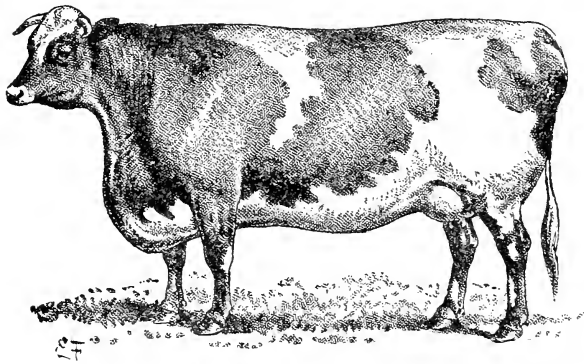


Fig. 435.—*Duchess by Daisy Bull* (186), *drawn by E. Forbes after a Painting by Dalby.*

not known, and this serves as a blemish upon stock of his breeding; the animals sell at lower prices, and the low prices themselves operate to the disadvantage of the cattle, and to that of their progeny and kindred.

It is equally true that in no business do high personal character, uprightness and good business habits pay better, especially if combined with good judgment and what may be termed breeder's intuitions. To be successful as a Short-Horn breeder now-a-days requires all this, and a very considerable capital.

SHORT-HORNS AS MILKERS.—This noblest and best bred of all breeds of neat cattle has been cultivated in most sections chiefly with a view to beef production, milk and butter having been secondary matters. Its capacity, however, for yielding milk and butter is probably not exceeded by any of the peculiarly milking breeds. Some of the smaller breeds, as the Ayrshires, are probably more economical milk producers, as they consume less food in proportion to the milk given. Those families of Short-Horns which have been bred for several generations as milkers exhibit great capacity, and though the cows milk down to little besides skin and bones sometimes, yet when they are dry they take on flesh rapidly, exhibiting often as symmetrical forms as those which give little milk and are always fat and sleek.

Short-Horn breeders manifest a strong repugnance to having honest photographs taken of their animals, and the pictures which they allow to

be published of them are such wretched caricatures, as a general rule, that to give a fair picture of a Short-Horn cow, a copy has been made of an oil painting in possession of Mr. A. B. Allen of New-York, of "Duchess by Daisy Bull," the great granddam of all the Duchess family (fig. 435). Obviously a faithful portrait, it is almost a demonstration that in form her descendants though selling for $30,000 or $40,000 apiece, do not surpass her.

DEVONS.—The cattle of the northern part of Devonshire, England, seem to be naturally thoroughbred—their origin veiled in obscurity, and their characteristics peculiar, and exceedingly fixed. Alloys of foreign blood seem to have little effect after a few generations, and they remain unchanged in general characteristics whether raised by skillful or unskillful breeders. They are of extraordinary beauty, great activity and vigor. In quality of beef they are superior to the Short-Horns. It is laid on also in the best places, so that being quick and kindly feeders, they are favorites in the market, and are, from their activity, much better adapted to the short, close pasturage of hilly and rough land, than are the heavier breeds. At the same time many excel as milkers, and when this quality is cultivated the returns of milk and butter are often extraordinary. When we consider in addition to their other good qualities that as working oxen they and their grades have no superiors, it is clear that the breed is one of very great value. It has, however, never received the same attention from breeders that the Short-Horn has, and perhaps, from its less size and slower maturity, does not merit it. It is difficult to see how it has been recently improved, or that its breeding has been more systematized or extended in this country. Pedigrees are kept carefully, and published in a herd-book, now some thirty years old, and it is only by applying to this breed the same systematic care and study of pedigree which the Short-Horns receive, that essential improvement can be expected. Fashion has a great deal to do with these things, and if Devons could become fashionable, too much could hardly be said in their favor, or too extravagant prices paid.

AYRSHIRES.—Within comparatively few years this breed has gained greatly in the dairy regions, especially where cheese factories abound. They are not less in favor with farmers near towns of moderate size where milk of fair quality is in demand. It is a comparatively modern breed, easily moulded to meet the breeders' notions, often showing diverse characteristics in different individuals; for instance, a great variation in size and length of limb, but the cows are almost uniformly good, and frequently great milkers.

There have been Ayrshire herd-books for several years, and of late special efforts have been made to render pedigrees more accurate. It is fair to suppose also that they have been more carefully studied, and that systematic breeding is producing its legitimate results. As a rule, however, pedigrees are too short to enable us to judge of the success of

breeders. A large quantity of milk is a nearly uniform characteristic, and this is and has been assidnously cultivated. They frequently have enormous udders—too frequently diminutive teats. Their milk is of high average quality, but the globules very small and not high colored. It is, therefore, adapted to making cheese rather than butter, in which respect it is regarded as superior to any other breed.

As a breed the Ayrshires are constantly, though very gradually, improving. They are getting to have larger teats, more uniformity of size and color, and doubtless are more uniformly good milkers. They are hardy, milk fever, the scourge of the butter breeds, being less frequent among them, and they are generally good feeders, and fatten easily when dry. Extraordinary cows are not unfrequently found among their grades and crosses, and there is probably no surer way of producing a herd of deep and rich milkers than to infuse Ayrshire blood with that of the Channel Islands, the latter preponderating perhaps.

HEREFORDS.—This breed, with all its excellencies, has really made very little mark in this country, and is not likely to. The Short-Horn is its superior, taking size, beef, milk, and adaptation to the yoke, all into consideration. For, good as the Herefords are as flesh makers and as working oxen, they are small milkers, and they do not seem to have been on the whole attractive to our farmers.

CHANNEL ISLAND CATTLE.—The Channel Islands lie upon the coast of France, and possess two quite distinct breeds of cattle. Those of Guernsey and Alderney, the most northern of the group, are similar, while those of Jersey are, as a whole, quite distinct from the others, and though the cattle of Guernsey have, from time immemorial even down to the present, been more or less introduced into Jersey, it has had little effect upon the general characteristics of the cattle of that island, though it has undoubtedly improved their milk and butter qualities.

The name Alderney is rather indiscriminately applied to the cattle of the Channel Islands—that is, to Guernseys and to Jerseys, and especially to cross-bred animals of both Guernsey and Jersey blood; but breeders of either race are careful to distinguish between them. As now reared in this country and in England, and not less so upon the Islands, the two breeds have few points of resemblance, except the production of highly colored butter in good and sometimes in extraordinary quantity.

THE JERSEYS are below medium size, the cows weighing 650 to 900 pounds. They possess a peculiar delicacy and beauty of form, lightness of bone and limb, and a deer-like style, which is heightened in many cases by their colors, their large, full eyes, and the white fillet around the black muzzle. The udder is often of good size and form, and the teats of fair size, though exceptions are too frequent. Fashion dictates that Jerseys should possess little or no white; that they should not be black or red, and indicates a preference for solid colors, agreeably shading into darker and lighter upon different parts of the body. Distinct grey

in all shades, grey fawn, yellowish fawn, light brown, &c., are, in the order named, perhaps the most popular colors. Of course useful points are not influenced by color. In fact some cows of extraordinary excel-

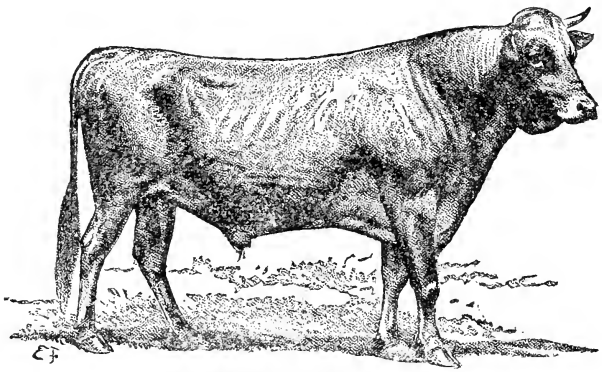


Fig. 436.—*Jersey Bull Lawrence.*

lence have been or are of the most unfashionable colors. The pictures presented of Jerseys are from accurate photographs. The one of the bull Lawrence 61 (imported in 1868, by Thos. J. Hand), represents him at 3 years old, and is one of the best animal photographs ever taken, showing well both the bull and the possibilities of the art (fig. 436.) The portrait

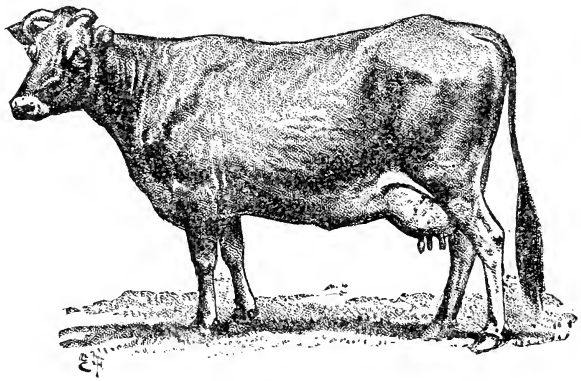


Fig. 437.—*Jersey Cow Alphea.*

of the cow, (fig. 437,) from an almost equally good photograph, represents Alphea 171, in her old age; bred by Col. Hoe of Morrisania, N. Y., a noble cow, of a solid brown color, a great milker and butter yielder,

and a prolific breeder. Their portraits are in the Jersey Herd Register, and their descendants have been prevailingly like them in color and good qualities.

A good Jersey cow at five years old ought to produce her own weight of milk in a month, and this should yield one pound of butter to each fifteen pounds of milk. Not many will do better than this, but there are a few extraordinary exceptions, as indeed there are in all breeds. The butter, however, is of peculiar excellence, being high colored, very firm and granular, and easily worked free from buttermilk.

Two herd-books have been established. The older one fell into disfavor on account of statements that some pedigrees had been loosely inserted. In the other one, called "The Herd Register of the American Jersey Cattle Club," much pains has been taken to established an accurate registration of the name, color, date of birth, breeder, sire and dam of American bred animals—the same facts concerning the sires and dams being recorded elsewhere in the Register back to importation. It is not therefore a herd-book for recording pedigrees, but a collection of data from which pedigrees may be constructed. This is unfortunate, for the result is that few breeders of Jerseys either understand or make use of pedigrees as they should. The same thing is true of the manner of registering animals and the neglect of pedigrees on the Island of Jersey.

THE GUERNSEYS are a larger breed than the Jerseys, weighing 800 to 1200 pounds. Beef points and a tendency to fatten have been more cultivated in them. They have far less delicacy of bone and limb, larger heads, and are often coarse and large framed. They are however level, deep bodied, well formed beasts; produce, as a rule, good sized calves; give as much milk as the Jerseys in proportion to their weight, on an average, and this yields an equal quantity of intensely high-colored butter. The milk of one Guernsey cow will usually give a fair yellow color to the butter produced from five or six common ones, Devons, Short-Horns or Ayrshires. As bred in this country, preference is given to those of yellow and light fawn colors, combined more or less with white, with the fillet surrounding buff muzzles, the eyes also being encircled with buff; although animals of other colors, but not inclining to grey or blue, are equally pure.

Guernseys are not so numerous in this country as the Jerseys, but they are favorites in every dairy to which they find their way, both on account of the quantity and quality of their butter yield. A herd-book has been recently begun, to which pedigrees are being sent in, but of which no volume has as yet (1877) been published.

No one will claim that the Guernseys have been improved in this country. They have been bred here for a good many years, and their effect in improving our dairy herds is very marked. The influence of the bulls in imparting the quality of yielding yellow butter to grade cows is powerful, and on this account they are favorites, and in demand. While the butter

of the Jerseys generally becomes pale on hay, that of the Guernseys retains its color, or some color, much longer and better, and the same quality is found in the grades.

The engraving presented of a Guernsey cow (fig. 438) is from a photograph of a fine cow of Thomas M. Harvey of Chester County, Pa.

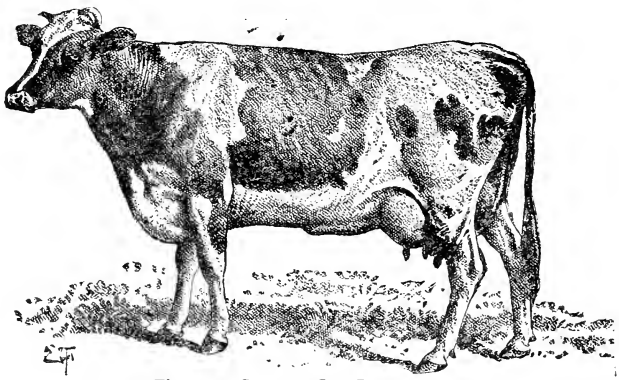


Fig. 438 —*Guernsey Cow Beauty.*

DUTCH OR HOLSTEIN CATTLE.—Among cattle whose chief value is for milk and dairy products, the Dutch breed merits pre-eminence. For some centuries they have been bred in North Holland and Friesland both for quantity and quality of milk, and as those cows which were the heaviest yielded absolutely, though perhaps not proportionably, more milk, size has been valued, and the best bred animals, as a rule, have the greatest weight. They are fairly well shaped, mature rapidly, are hardy, good feeders, and make fair beef. They are black and white in color, rarely pure white, and, it is said, sometimes black. As milkers they yield milk of good quality, especially for cheese making, giving rarely less than sixteen, and often double that number of quarts daily. The milk, of course, varies in quality like that of all other races, but it is much better than would be supposed, from the fact that large cows seldom give the richest milk, for, as a rule, the smaller the breed the richer the milk.

Some twenty years ago, when the best bred and largest cattle of Holland were strangers to us, Mr. Chenery of Boston, visited that country and brought out a herd of the best which he could buy, and they proved of great excellence as milkers. In subsequent years some of the imported animals and their produce were sold at very high prices. Why they were called Holsteins was always a mystery, and many supposed that, as a thrifty merchant, the importer wished to establish a "trade mark" which would secure him in his monopoly, but this was probably a mistake. It is enough for us that the name was fixed upon them, and has been

generally accepted by breeders, who are now numerous. They may be imported direct from Holland at a cost of about $300 or $400. The number in the country is still quite limited, so that, except in the Eastern States, they are a curiosity at agricultural exhibitions. Yet, following the fashion of the times, and not without good reason, the breeders co-operated with Mr. Chenery in establishing a herd-book.

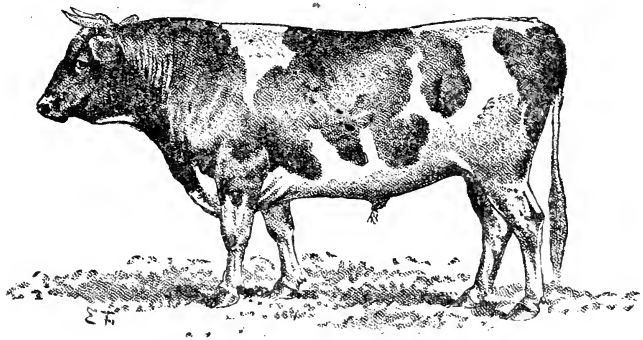


Fig. 439.—*Holstein Bull Rolf.*

The engraving of the Holstein bull "Rolf" (fig. 439) is a close copy of a fair photograph of the bull at two years old. He weighed about 1,600 pounds, and though with a little excess of dewlap, is a well shaped animal. However, in the Holsteins beef is only a secondary consideration, and compared with the Short-Horns, which they resemble in stature, they are often too coarse framed, and lack proper beef points.

Breeds of Sheep.

Important and valuable soever as sheep are, they occupy a decidedly secondary place in the agriculture of the Atlantic States and Mississippi valley. They are, however, relatively more important in California, where they are raised almost exclusively for their wool and increase. The total number of sheep given in the census of 1870 as existing in the whole country is 28,477,951. Thus it will be seen that they but little outnumber the neat cattle, while they might economically be nearly twice as numerous. The improvement in sheep culture in the past few years consists in the extensive dissemination of well bred rams of various breeds, which occurred in consequence of the high prices which prevailed during the war and immediately subsequent, and in consequence of the abundance of the circulating medium which was considered money.

When the markets are favorable, sheep offer three sources of profit to the breeder, namely, wool, early lambs and mutton. The lambs are important, not only as supplying the annual loss of the flock by slaughter and

through natural causes, but are of themselves a very considerable source of income, especially to breeders of the proper mutton breeds.

Sheep are naturally classified according to their wool, into Fine wools, Middle wools and Long wools.

The MERINOS, which trace their origin to the flocks of Spain, are the breeds most valued for fine wool. The French Merinos are a kindred breed improved by direct crossing with Spanish, and indirect crossing with the Saxony Merinos. The Saxony and Silesian Merinos are only carefully and peculiarly bred Spanish Merinos, upon which changes have gradually been wrought by a long course of careful breeding, which makes them quite distinct in appearance, while in the American Merinos the Spanish blood has likewise been kept nearly or quite pure, and yet the sheep have undergone essential modifications, being bred with somewhat different objects in view. They have been improved in form, and weight of fleece perhaps, but in fineness of fleece they have not kept up with the Merinos bred in Germany and Silesia.

The Merinos are of only moderate size, noticeable for the ponderous horns of the rams, and for the great abundance of folds and wrinkles which the loose skin presents. They are remarkable also for the large quantity of "yolk"—a natural soap, called grease,—which exudes from the skin and fills the wool.

These sheep fatten rapidly, and are good mothers, and the cheaper ones, or grades, are valued by farmers living near good markets as breeders of early lambs, when crossed with rams of the mutton breeds.

The number of breeds of sheep is so great that it is hardly possible that any one has thorough knowledge of them all. In this country, fortunately, we have only those whose positive excellence recommends them.

MIDDLE WOOL SHEEP, so called, are all English breeds. Among them the *South-Downs* are pre-eminent, on account of their symmetry, their excellent, close, moderately fine, useful fleece, and their superior mutton. They are the best of the proper mutton breeds which are found in considerable numbers in this country. They are hornless, with grey faces and dark greyish legs, very broad in the loin, deep in the chest, thick through the heart, with wide saddles, wide and deep hams, small bones and little offal. They grow quickly, are fat at all ages, and are economical feeders. Other "Down" sheep are somewhat larger, or have been modified from this general type by crosses taken with some of the long wool breeds.

LONG WOOL SHEEP comprise a number of excellent breeds. The *Leicesters*, or Bakewells, the *Lincolns* and the *Cotswolds* are the most widely bred, and probably the latter are best adapted to our uses, being most uniform in character and best known. They are of the largest size, hornless, well formed as flesh producers, with small offal, hence with bones no heavier than necessary to support their great weight. Their wool is long, say 12 to 14 inches in length, very glossy and silky, but not fine as compared with the Merino, nor so fine as that of the intermediate Down

breeds. They grow with great rapidity, requiring, of course, abundant feed. The lambs are earliest in market, and bring the highest price. Long wool sheep require more careful attention than our Merinos have generally received, and the openness of the fleeces makes more shelter desirable for them. The wool has of late years been greatly in demand, and though the excessive prices no longer rule, yet important industries depend upon long or combing wool, which secure for it a ready sale.

Breeds of Swine.

The superior breeds of pigs all come from England, where they have had a comparatively short existence. Nevertheless the improvements in the various breeds were made there by introducing foreign blood, especially Chinese and Neapolitan, upon the long established and, in many respects, valuable breeds native to the country. This gives the modern breeds an antiquity which in some measure accounts for the permanence of the types.

The efforts to produce breeds of swine in this country have, so far, nearly failed, no doubt because the foundation we have to build upon is either a proper cross-breed or a mixture of breeds of no antiquity of breeding which would give permanence to the type when formed. We hear little now-a-days of any American breeds except the Chester Whites, and the Poland Chinas. These are neither of them fixed breeds, and would rapidly disappear were not great pains taken in their breeding.

The Chester Whites originated in Chester county, Pennsylvania, from successful crosses of the native mixed swine with imported English breeds. They are a long, rangy, rather coarse, well-haired breed, having thick shoulders, good hams, broad back and loins, and much side pork. They are healthy, good foragers, good breeders and great milkers. Some have large, leathery lop ears, others thin and lopping ears, while others have smaller erect ears, and there is a considerable diversity in size; some occasionally reaching the weight of 800 to 1000 pounds. They are favorites with the farmer, and have been so long bred with care in Chester County that their characteristics are tolerably fixed, so that they may be used to improve the common pigs.

The Poland Chinas are a composite breed of no-telling-what, with the Berkshires as a basis. They are very large in stature, of fair weight for their size, black—spotted or flecked with white. They have small heads, little offal, and are regarded as profitable feeders. They originated in Ohio, and have borne, and with many still bear, the name of their originator, Mr. Magie. There is an irrepressible tendency in the breed to revert towards one of its original factors, usually to the Berkshire, upon which breed it is an improvement only as grades and cross-breds are always an improvement upon established breeds, as they exhibit few faults and the merits of both parents intensified.

The Jefferson County Breed passes under various names, improved Cheshires, improved Yorkshires, etc. Some very large pigs, are

raised in Jefferson County, N. Y., from large white English pigs obtained in Canada. The breed is not properly established except as a cross breed of some merit. It is not at all likely that without occasional infusion of fresh blood they would be at all superior to the large Yorkshires which they resemble, except in being finer in bone and more delicate. They are very large, thin skinned, thin haired and small boned.

The BERKSHIRES are the most important of the English breeds for this country, being adapted to all parts of it, hardy and prolific, both at the North and extreme South, excellent foragers, and possessing an extraordinary aptitude to fatten, while their hams and shoulders are large in proportion. They are not so profitable feeders as some of the other breeds, or as their grades, and it is for the production of these that all the pure breeds are most valuable. It is doubtful whether the grades of any other breed will produce on the same feed an equal weight of pork, and certainly, if we regard the proportion which hams and shoulders bear to the rest of the animal, the quality will be superior.

The Berkshires are now bred with great particularity, black with more or less white on the face and chops, white feet and a white tip to the tail. White flecks occur naturally over the body, and being objected to, the best shaped pigs are not unfrequently absurdly sacrificed as breeders because of these markings. The occurrence of a brush of red hairs, is no indication of impurity of blood, for red occurred with the black and white in the ancient Berkshires, and occasionally crops out now-a-days. The skin varies in color from slaty to bluish black, with a shade of red—that which is preferred being a distinct plum color, readily recognizable.

SMALL BLACK BREEDS.—The Essex, of the small black breeds, is best known in this country—so much so, indeed that all well-bred pigs which are altogether black or bluish black, are called Essex. The breed is very high bred, with exceedingly small bones and little offal, short faces, thin, erect ears, long and round trunks, medium sized hams and shoulders, and possesses extraordinary aptitude to lay on fat, for the production of which—side pork and lard (by many regarded as the most important objects for which pigs are raised)—they have, it is probable, no superior. Their grades with good common stock are in these respects superior to the full bloods.

Other black breeds, Dorsets, Black Suffolks, &c., are very similar, and have made no special mark in this country.

SMALL WHITE BREEDS.—There are several of this group pretty well known in this country. They have been the subjects of more improvement than any other class of pigs in England of late years, and as a consequence slight variations have been seized upon to cultivate into fixed peculiarities.

The *Small Yorkshires* are probably best worthy of notice. They are small in stature, but long and very solid, weighing often 400 to 450 pounds when mature. They are bred with such exceedingly short faces that the

extreme length exceeds the length of the carcase measured from between the ears, by only two or three inches. There is very little offal; the hams and shoulders are large, side pork thick and solid, and leaf lard abundant and in short they combine porcine excellencies to an unusual degree, and lay claim, not without good show, to be the most economical feeders of all pigs, laying on flesh with the least consumption of food.

The Short-Faced Lancashires are a branch of the family, which has been somewhat cultivated in this country, and they possess its well known characteristics.

The Windsor or Prince Albert breed is closely related and quite similar. It comes from the Shaw Farm at Windsor. The pigs are generally not quite so short-faced, but otherwise, to an ordinary observer, are undistinguishable.

The Suffolks.—Under this name in this country several branches of the small white English pigs were rather indiscriminately grouped, and all possessed merit. They are classified with the Yorkshires, and the finer they are bred, the closer they approach them.

THE ENGLISH LARGE WHITE PIGS have been somewhat introduced into the United States and Canada. They are not as economical feeders as the small breeds. The largest are the *Large Yorkshires*, a breed of great size; rapid growers, and attaining a weight of 800 to 1,000 pounds at two or three years old.

NOTES ON FLORICULTURE.

COVERING HALF-TENDER PLANTS.—Many ornamental plants are hardy, and do not positively need covering for winter. But even these will bloom earlier and more profusely if they have some protection. Others require a cover to prevent injury or destruction. There are various modes of applying this protection. In dooryards and ornamental grounds nothing should be employed that will give a repulsive appearance. Whatever may be used, a neat trimming with evergreen branches on the top may be made to impart a positively ornamental effect. Plants which hold green leaves the winter through should not have much else than the evergreens, so that air may be freely admitted and decay prevented. Others, the roots of which only remain, such as the bulbs of hyacinths, may be covered with leaves or manure to any desired depth. If with leaves, the evergreens will hold them from blowing away; if with manure, they will veneer the surface. In order to do the work neatly, cut the branches all of the same length,

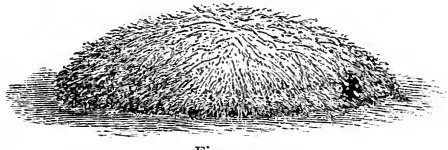


Fig. 440.

and begin by placing a circle outside with the tops all pointing inwards; on these place another circular row, until all is finished, like the thatching of a straw roof. With a little care this work may be neatly done, with a pleasing effect, as imperfectly shown in the cut, fig. 440.

FARMERS' FLOWER BEDS.—There are few farmers who keep poultry shut up in pens or yards, for they can hardly afford to do so, as the fowls obtain most of their living on the premises by picking up scattered grain, seeds of weeds, insects and scattered kitchen crumbs. The result is that those members of the family who attempt to raise flowers in beds cut in the turf of the door-yard, are sometimes sadly annoyed by seeing their flower seeds and plants thrown out by scratching hens. To avoid this disaster they usually cover the whole of the beds for a time, or while freshly made, with unsightly brush, which not only disfigures their appearance, but impedes, deranges and entangles the plants as they advance in growth. A much neater, easier and more perfect way is to make a miniature circular hedge of small branches around the bed (fig. 441.) If the brush is spreading and well branched, a few will answer the purpose, as the hens will not attempt to pass through even a moderate barrier, and they will not go over it if only twenty inches high, unless they can alight on the top. Evergreen or leafless branches will do. If neatly done, it is an ornament rather than otherwise, and any bed may be protected by a few minutes' work.

Fig. 441.

BEDS OF SHRUBBERY.—The owners of small lawns and ornamental grounds are often puzzled to know the best way to treat small shrubs. If they plant them in grass, they grow feebly; and they do not succeed much better with small circles dug about them. The best way is to allot to them certain distinct spaces, where they can be grouped together in mellow, cultivated beds, and then to adopt the mode which is described in a late number of the London Garden as having been employed in the gardens of the Thames embankment, the bare earth of the beds being hidden by mignonette, Virginian stock and other small annuals. These annuals operate, it is true, somewhat as weeds in reducing the vigor of the shrubs, but far less so than a grass surface. We have seen beautiful masses of petunias employed to clothe a bare surface with excellent effect.

ROSE SLUG.—The Gardener's Monthly recommends the following to destroy the rose slug: Add a teaspoonful of powdered white hellebore to two gallons of boiling water. Apply when cold, in a fine spray, bending the tops over so as to reach the under surface of the leaves. One application is usually sufficient. This is a good way to treat the currant worm.

THE FARMER'S REGISTER.

THE LISTS presented below are, as usual, made up from the advertising columns of THE COUNTRY GENTLEMAN, during the year preceding date of publication (Nov. 1, 1877,) and thus include the leading names in each department—those also most likely to be able to supply orders:

BREEDERS OF IMPROVED STOCK.

AYRSHIRE CATTLE.

Abbott, J J C.....Montreal, Can
Averill, L F.....Pomfret Centre, Ct
Ball, A P.....Derby Line, Vt
Barnes & Son, E H.....Milford. N Y
Benson, Burpee & Co.... Philadelphia, Pa
Brown, J Carter,.....East Greenwich, R I
Brown. Henry T.....Providence, R I
Casterline, J A..... Dover, N J
Cloud, T A.....Kennett Square, Pa
Cochrane, M H.....Compton, Can
Cochran, T A.....Baltimore, Md
Collins, Charles,.....Fellowship, N J
Community Farm,.....Oneida, N Y
Cooper, T S.....Coopersburg, Pa
Crozier. William,..... Northport, N Y
Curtis, F D.....Charlton, N Y
Denny & Bailey,..... Casadaga, N Y
Dimon. John,..... Putnam, Ct
Drew, L S.....South Burlington. Vt
Drew, L.....Hamilton, Scotland
Ely, L D., Jr.....Rochester, N Y
Fitch, Thomas.....New-London, Ct
Freeman, J W..... Troy, N Y
French, J D W.....North Andover, Mass
Gibb. John L.....Compton, Can
Gold. T S.....West Cornwall Ct
Guy, Thomas,..... Oshawa. Ont., Can
Ham, E.....Verbank, N Y
Holden, J H..... Belleville, Can
Hough, S D..... Weatogue. Ct
Ireland. A.....Goshen, N Y
Kay, W F.....Montreal, Can
Kendall Farm,.....Woburn, Mass
King, W S.. .....Minneapolis. Minn
Leonard, R W.....New-Castle, N Y
Magone, D., Jr.....Ogdensburg, N Y
Merriam, Herbert,..... Weston. Mass
Miles, E T..... Fitchburgh Mass
Morris, F.....Philadelphia, Pa
Norton, W C..... Aldenville, Pa
Parry. William,..... Cinnaminson. N J
Peckham, C H..... Providence. R I
Phelps, W W.....Weatogue, Ct
Pullen, W.....Miamiville, O
Reeve, C.....Minneapolis. Minn
Robins, J N.....Northport, N Y
Rutherford, J T.....Waddington. N Y
Stephenson, J B..... New Rochelle, N Y
Stewart & Son, H L...Middle Haddam, Ct
Sturtevant Brothers, S. Framingham, Mass
Van Waganen, J..... Lawyersville, N Y
Vaughan, W P.....Providence. R I
Wattles, W.....Sidney, N Y
Wells, S M & D..... Wethersfield, Ct
Whitney, N S.....Montreal, Can
Williams, E & J C..... Montclair, N J
Wotherspoon, I.....Montreal, Can

DEVON CATTLE.

Arnold, W H..... Otego, N Y
Brown, J Carter,.....East Greenwich, R I
Brown, C.....Springhill, Tenn
Buckingham, J.....Zanesville, Ohio
Cole. Walter,..... Batavia, N Y
Dimon, John, ...Putnam, Ct
Howard. L R C.....Zanesville, O
Longenecker, J B.....Union Deposit, Pa
Morris, Dr. J C. .....West Chester. Pa
Peck, B F..... East Bethany, N Y
Rogers, D..... ... North Cornwall, Ct

SWISS CATTLE.

Aldrich, D G.....Worcester, Mass

GUERNSEY CATTLE.

Beach, C M..... Hartford, Ct
Betts, S..... Camden, N J
Brown. A T .....Boston, Mass
Bowditch. E F..... Framingham, Mass
Lawrence, Jas..... Groton Mass
Despard, H.....New-Castle, N Y
Malleson, C H... ..... Hudson. N Y
Norton, Edw..... Farmington, Ct

HEREFORD CATTLE.

Aldrich, W W..... Elyria, O
Clopper, F Y..... Greensburg. Pa
Stone. Fred. Wm.....Guelph, Can

HOLSTEIN OR DUTCH CATTLE.

Chenery. W L.....Belmont, Mass
Comer, J H..... Goshen, N Y
Ellis, J T..... Flemington. N J
Hoffman. H C.....Horseheads, N Y
Houghton Farm,.....Putney. Vt
Johns. J.....Newcastle, Del
Miller, Gerritt S.....Peterboro. N Y
Oneida Community,..... .....Oneida. N Y
Smith & Powell,.....Syracuse. N Y
Tilton, W S.....Togus. Me
Wales, T B..... S. Framingham, Mass
Washburn E M.... Lenox Furnace, Mass
Whiting, T E..... Concord, Mass

JERSEY OR ALDERNEY CATTLE.

Agnew, Dr. C R..... Palisades, N Y
Alexander, A J..... Spring Station, Ky
Alexander, Jos .....Chardon, O
Allinson, J..... Yardville, N J
Andrews, E S..... Orange, N J

Arnold, E J.....Bronte Lodge, Jersey
Barlow & Co., A G..North Ridgeway, N Y
Beekman, A S..... South Branch, N J
Betts, S.....Camden. N J
Benson, Burpee & Co.....Philadelphia, Pa
Bolles, W W..... ..... Toledo. O
Border-Bowen, H..... Bristol, R I
Bowditch, E F..... Framingham, Mass
Briggs, J B.....Russellville, Ky
Brown, C..... Spring Hill, Tenn
Brown, J Carter,.....East Greenwich, R I
Brown, J F. ..... Lunenburgh, Mass
Burden, J A & I T..... ..Troy, N Y
Burns, W.....Montreal, Que., Can
Cameron, Colin,..... Brickerville. Pa
Camp, J F..... Apalachin, N Y
Chase & Co., E T..Deerfield Centre, N H
Churchman, F M..... Indianapolis, Ind
Clift, W..... ..... Mystic Bridge, Ct
Cloud, T A.....Kennett Square, Pa
Cochran, T A.....Baltimore, Md
Cooley, J G.....North Franklin. Ct
Crozier, William,.....Northport, N Y
Curran, H B.....Whitestown, N Y
Despard, H.....New-Castle, N Y
Dinsmore, W B.....Staatsburgh, N Y
Earll, J H.....Skaneateles, N Y
Edgerton, James,..... Barnesville, O
Farlee, G W..... Cresskill, N J
Fitch, Thomas, ...New London, Ct
Goodman, R..... Lenox, Mass
Griswold. E D.....Orwell, Vt
Gulick, W..... Princeton, N J
Hand, Thos. J.....Sing Sing, N Y
Harris, G W..... Morrisania, N Y
Hayt, James A.....Patterson, N Y
Herr, A G.....St. Matthews, Ky
Hoe, R M..... 31 Gold-St., N Y
Hoover, G M..... Bradford. O
Jackson. George,..... Indianapolis, Ind
Jones, Mrs. E M....Brockville, Ont., Can
Juliand, Joseph.....Bainbridge, N Y
Kelsey, H C.....Trenton. N J
Lincoln, W S.....Worcester, Mass
Mackie, J M .....Great Barrington, Mass
McCready, W R.....Saugatuck, Ct
Mead, H.....Golden's Bridge, N Y
Mills, Lyman A.....Middlefield, Ct
Montgomery, W B.....Starkville, Miss
Morrell, R.....Manhasset, N Y
Newell, Dr. A D....New-Brunswick, N J
Osgood, H B..... ... Whitinsville, Mass
Owen, C H.....Buckland. Ct
Parke. H S.....Bay Side, N Y
Parmly, Dr. E..... Oceanic, N J
Patterson, R C.....Patterson, N Y
Pennington, J C & D.....Paterson, N J
Quinby, G A..... ... Aldie, Va
Reeder. E.....New Hope. Pa
Reynolds, I W H..... Frankfort, Ky
Rieman. Joseph H.....Baltimore. Md
Roberts D G.....Pittsfield. Mass
Robins. J N.....Northport. N Y
Rutherford. W L & W..Waddington. N Y
Sargent, C S..... .Brookline, Mass
Sharpless Charles L... ..Philadelphia. Pa
Sharpless, Samuel J.....Philadelphia Pa
Shaw, G J.... ..... Detroit, Me
Shields, H L.....Bennington, Vt
Skinner, W E..... Hamburg, N J
Smith. S B..... Roxbury, Ct
Starr, F R..... ..... Litchfield. Ct
Stephens, R H...St. Lamberts, P. Q., Can
Stockton, S W.....Princeton, N J
Streeter C B..... Youngstown, O
Taylor, W S.....Burlington, N J
Taylor, C S.....Burlington, N J
Thorne, E.....Millbrook, N Y
Tilton, W S..... .....Togus, Me
Underhill A A.....Poughkeepsie, N Y
Warning, G E., Jr.....Newport, R I
Watrous, D W....51 Ferry-St., New-York
Weld. M C.....New-York
Wing. John D.....Millbrook. N Y
Woodruff,..... Terryville, Ct

NORFOLK RED POLLED CATTLE.

Taber, G F..... Patterson, N Y

SHORT-HORN CATTLE.

Abbott, Joseph,.....Bluff Point, N Y
Alexander, A J..... Spring Station, Ky
Allen, L F.....Buffalo, N Y
Avery & Murphy,..... Port Huron. Mich
Ayres & McClintock,..... Millersburg, Ky
Bailey, D R..... ..... Baldwin, Wis
Ball. A P.....Derby Line, Vt
Barbee, F J.....Paris, Ky
Beattie. Simon, ...Annan, Scotland
Bedford, G M.....Paris, Ky
Bedford, E G..... Paris, Ky
Bellwood, John,.....Newcastle. Can
Bethune, J N.....Warrenton, Va
Blanchard, W F.....Manlius, N Y
Bowman, A M..... Waynesboro, Va
Briggs, J B.....Russellville, Ky
Brown's Sons, James N.....Berlin, Ill
Brown. S S.....Galena, Ill
Bussing, D S.....Minaville, N Y
Butts. G.....Manlius, N Y
Chase, W A.....Groton, Mass
Christie, D..... Paris, Ont., Can
Cochrane, M H... ..... Compton. Can
Cockrill, M S..... Nashville, Tenn
Coen, P A..... Washburn, Ill
Collard, J.....Des Moines, Iowa
Combs, L., Jr.,.....Lexington, Ky
Corbin, H.....Paris, Ky
Cornell, Ezra, Estate of,.....Ithaca, N Y
Cowan, J G.....Oregon, Mo
Cowan, J T.....Cowan's Mills, Va
Craig, J R.....Edmonton, Can
Curtis, N M.....Ogdensburg, N Y
Davinport, A H..... Lexington, Ky
DeForest, J J.....Duanesburg, N Y
Dodge. William B.....Waukegan, Ill
Dun. John G.....London, O
Dun, R G.. .....London, O
Frank & Son,.....Cheltenham, Ont., Can
Fellows, B..... Clifton, N Y
Ficklin, S W..... Charlottesville, Va
Foskett, G L..... Winsted. Ct
Galbraith. T ..... Westport. Ct
Gibson, W H..... Litchfield, Minn
Gibson, R..... London, Can
Goe. J S..... Brownsville, Pa
Goff, B P..... Winchester, Ky

Goodell D H.....Antrim, N H
Groom & Son, B B.....Winchester, Ky
Hall, James.....Paris, Ky
Hampton, A H.....Winchester, Ky
Harison, T L.....Morley, N Y
Hayward, Stephen,....Cummington, Mass
Heacock, Seth,.....Kettleby, Can
Hills, C.....Delaware, O
Hunter, J & R.....Alma, Can
Iles, Edward,.....Springfield, Ill
Jones, T C.....Delaware, O
Juliand, J.....Bainbridge, N Y
Ketchum, M.....Westport, Ct
King, Wm. S.....Minneapolis, Minn
King. A.....Malone. N Y
Kinnaird, J G.....Chilesburg, Ky
Kissinger, J H.....Clarksville, Mo
Latimer, J S.....Abingdon, Ill
Lansing, C M.....Niagara, Ont., Can
Lowry, W.....Pine Grove, Ky
Markham, W G.....Avon, N Y
Matthews, Claude,.....Clinton Ind
Maxon, G G .. ..Schenectady, N Y
McKeen, T L.... ... . Easton, Pa
Meredith & Son, S ...Cambridge City, Ind
Miller, George, ...Markham, Can
Miller. John,.....Brougham, Can
Miller, Robert, ...Pickering, Can
Milne, Robert, ...Lockport, Ill
Murray, George,..... .. Racine, Wis
Neely, W J..... ... Ottawa, Ill
Otley. R..... .....Kewanee, Ill
Page, John R..... ....Sennett, N Y
Parsons, C., Jr.....Conway, Mass
Patterson, N..... Paris, Ky
Patterson, J L.....Paris, Ky
Patterson, S T.... .....Paris, Ky
Pickrell, J H... .....Harristown, Ill
Porter & Son, J D..... .. Alexis, Ill
Prewitt, J W.. .....Winchester, Ky
Prewitt. R H.....Pine Grove, Ky
Pullen, W.....Miamiville, O
Redmon, C T & S B.....Winchester, Ky
Reid. W B..... .. ....West Chester, Pa
Richardson, W H.....Lexington, Ky
Rolph. W., Jr.. ... Markham, Ont., Can
Russell, J..... Richmond Hill, Ont., Can
Sanborn, J P.....Port Huron, Mich
Schnebly. L R..... ...Fairview Md
Scott & Co., Joseph,.....Paris, Ky
Sherman, H B..... Burnett Wis
Skinner, W E..... Hamburgh, N J
Smith. B W..... Lexington, Ky
Snell. John's Sons, ...Edmonton, Can
Spear & Son, J H..... Tallula, Ill
Sprague, G..... Des Moines, Iowa
Stone F W..... .....Guelph, Can
Streator, S R.....East Cleveland, O
Sudduth. W L. .....Winchester, Ky
Talcott & Sons, J.....Rome. N Y
Talbott. Thomas E.....Dalhoff, Mo
Taylor, C S.....Burlington, N J
Taylor John B..... .....London. Can
Terrill, M W..... ... Middlefield. Ct
Thornton, J C..... .....Avonia, Pa
Van Meter, B F & A..... Winchester, Ky
Van Meter, I C.... .....Lexington, Ky
Van Meter, W C.....Winchester, Ky
Van Meter, J M.....Midway, Ky
Wadsworth, Charles F.....Geneseo, N Y
Warfield, William,..... Lexington, Ky
Warnock, W ..... Cynthiana, Ky
Wentworth, John,..... Summit, Ill
Wood, Charles,..... Baden, Mo

HORSES.

Alexander, A J..... Spring Station, Ky
Backman, Charles,..... Goshen. N Y
Baker & Harrigan, Comstock's Landing. N Y
Baird. D.....Springfield Centre, N Y
Battell, R..... Norfolk. Ct
Beekman, A S..... South Branch, N J
Brown, C..... Spring Hill. Tenn
Brown, J Carter,.....East Greenwich, R I
Chapin, J H..... Hoosac, N Y
Chenery, W L.....Belmont, Mass
Clark, Leander.....Newburgh, N Y
Cochrane. M H.....Compton, Can
Crozier, William,.....Northport. N Y
Dimon, J.....Putnam, Ct
Dorsey, L L..... Louisville. Ky
Drew, L.....Hamilton. Scotland
Dun. J G..... .... London O
Ficklin, S W.....Charlottesville. Va
Fitch, Thomas,.....New-London. Ct
Fullington & Co., James...Irwin Station, O
Goe, J S.....Brownsville, Pa
Gibb. J L..... Compton, P Q., Can
Gibson, T.....Spring Hill, Tenn
Harison, T L.....Morley. N Y
Helm, H T..... Lake Forest, Ill
Herr, A G.....St. Matthews, Ky
Herr, L..... Lexington, Ky
Howard. L R C.....Zanesville. O
Jewett, G M.....Zanesville, O
Johnson, J P.....Spring Hill Tenn
Juliand. Joseph.....Bainbridge, N Y
Kay, W F.....Montreal, Can
Kellogg. P C.....110 John-St., New-York
Long, Wm.....Lansing, Ont., Can
Mali, H W T..... Stockbridge. Mass
Mason. F A.....Putnam, O
McKeen & Hulick,.....Easton, Pa
Meikle. W .....Pendleton, Ind
Miller, George,.....Markham Ont , Can
Moore. John,....Comstock's Landing. N Y
Osborne. W F.....Ansonia. Ct
Parker, J J,.....West Chester, Pa
Peck, W H.....Hartford, Ct
Penistan, R..... Lexington, Ky
Pine, J K P.....Troy, N Y
Reynolds, I W H..... Frankfort, Ky
Russell, H S.....Milton. Mass
Shaw, G J..... Detroit, Me
Sherman, H B..... Burnett. Wis
Shields, H L.....Bennington. Vt
Smith & Powell,.....Syracuse, N Y
Stephens, Sheldon,.....Montreal, Can
Stevens. George C.....Milwaukee, Wis
Stone. F W..... Guelph, Can
Swigert, D.. ..... Spring Station, Ky
Thorne, Edwin, ...Millbrook, N Y

SHETLAND PONIES.

Alexander, A J..... Spring Station, Ky
Allan, J S.....Montreal, Can

Cameron, C.....Brickerville, Pa
Cochrane, M H... .....Compton, Can
Reesor & Co., R.....Markham, Ont., Can
Swigert, D.....Spring Station, Ky

COTSWOLD SHEEP.

Abbott, J J C.....Montreal, Can
Aldrich, D G..... .. .. Worcester, Mass
Allen, W C..... Buffalo, N Y
Appleton, D F.....Ipswich, Mass
Barbee, W H..... Georgetown, Ky
Bedford, G M.....Paris, Ky
Birrell & Johnston,..Greenwood, Ont., Can
Briggs, J B.....Russellville, Ky
Burroughs, H K..... . . Roxbury, N Y
Community Farm,.....Oneida, N Y
Cooper, T S.....Coopersburg, Pa
Craig, J R.....Edmonton, Can
Crozier William,..... Northport, N Y
Deuel, S T..... Little Rest, N Y
Frank & Son, A....Cheltenham, Ont., Can
Garne, R..... ..Aldsworth, England
Gibb John L .....Compton, Can
Harris, Joseph,.....Rochester, N Y
Heacock & Son, S.... Kettleby, Ont., Can
Hills, C..... Delaware, O
Ingersoll, George,.....Charleston, N Y
King, W S.....Minneapolis, Minn
Lane, Wm.....Northleach, England
Lemon, H.....Thornhill, Ont., Can
Mattocks, C P. .....Portland, Me
Maxon, J J.....Gallipolis O
Miller, George,.....Markham, Ont., Can
Miller, W M.....Claremont, Ont., Can
Morris, Francis,.....Philadelphia, Pa
Morris, J C.....West Chester, Pa
Robins, J N.....Northport, N Y
Rolph, W Jr..... Markham, Ont., Can
Russell, J..... Richmond Hill, Ont., Can
Sayre & Son, Cooper, Oak's Corners, N Y
Sedgwick, H.....Cornwall Hollow, Ct
Shoemaker, S M.....Baltimore, Md
Smith S B..... Roxbury, Ct
Smith, W C ...New-Hamburgh, Ont., Can
Snell, John's Sons,.. .....Edmonton, Can
Stone, Fred. Wm.... .....Guelph, Can
Swanwick, R..... Cirencester, England
Taylor, C S..... Burlington, N J
Terrill, M W..... .....Middlefield, Ct
Thornton, J C..... Avonia, Pa
Van Waganen, J..... Lawyersville, N Y
Ward, C K.....LeRoy, N Y
Wilder, J B.....Louisville, Ky

LEICESTER SHEEP.

Drevar, Dr. A.....Annapolis, Md
Ingersoll, George,.....Charleston, N Y
Magone, D. Jr.....Ogdensburg, N Y
Meredith & Son, S ...Cambridge City, Ind
Rutherford, W L & W..Waddington, N Y
Snell, John's Sons,.....Edmonton, Can
Thornton, J C..... Avonia, Pa
Walsh, T.....Alexandria, Va

LINCOLN SHEEP.

Gibson, R.....London, Can
King, W S..... Minneapolis, Minn
LeClair, Peter,.....Winooski, Vt
Reeve, C.....Minneapolis, Minn

MERINO SHEEP.

Brunson & Mariner,....East Bethany, N Y
Chamberlain, Wm. L.... Red Hook, N Y
Cole, Walter,..... Batavia, N Y
Cowles, C P.....Syracuse, N Y
Earll, J H..... Skaneateles, N Y
Gibbs, M F..... Livonia, N Y
Goe, J S..... .....Brownsville, Pa
Joslin, J O.....Tiashoke, N Y
Markham, W G.....Avon, N Y
Peck, B F.....East Bethany, N Y

SHROPSHIRE-DOWN SHEEP.

Cochrane, M H.....Compton, Can

SOUTH-DOWN SHEEP.

Aldrich, D G..... Worcester, Mass
Alexander, A J..... Spring Station, Ky
Allen, T.....Pittsfield Mass
Allinson, J..... Yardville, N J
Benson, Burpee & Co.....Philadelphia, Pa
Bowman, A M..... Waynesboro, Va
Cameron, C.....Brickerville, Pa
Cooper, T S..... Coopersburg, Pa
Crozier, William,..... Northport, N Y
Dun, John G.....London, O
Frank & Son, A...Cheltenham, Ont., Can
Gibson, R ..... London, Can
Harison, T L..... Morley, N Y
Heacock & Son, S....Kettleby, Ont., Can
Holly, J I.....Plainfield, N J
Hulse, B..... Allentown, N J
Jones, T C..... Delaware, O
Marsh, R..... Richmond Hill, Ont., Can
Morris, Francis,..... Philadelphia, Pa
Pettit, C..... .....Salem, N J
Reeder, E.....New-Hope, Pa
Reynolds, I W H..... Frankfort, Ky
Sharpless, Samuel J.....Philadelphia, Pa
Stone, Fred. Wm..... Guelph, Can
Thornton, J C..... Avonia, Pa
Wentworth, John,..... Chicago, Ill
Wing, John D..... Millbrook, N Y
Wood, Thomas,.....Doe Run, Pa
Woods, H..... Merton, England

OXFORD-DOWN SHEEP.

Kelsey, H C.....Newton, N J
Cooper, T S..... Coopersburg, Pa

BERKSHIRE SWINE.

Allen, W C.....Buffalo, N Y
Allinson, J. .....Yardville, N J
Ball A P.....Derby Line, Vt
Balderston, E..... Morrisville, Pa
Barbee, G L..... Georgetown, Ky
Barbee, W H..... Georgetown, Ky
Barlow & Co., A G..North Ridgeway, N Y
Barney & Sons, E H.....Milford, N Y
Beckett & Co., R S.....Millville, N J
Benson, Burpee & Co.... Philadelphia, Pa
Birrell & Johnston,..Greenwood, Ont., Can
Bowman, A M..... Waynesboro, Va
Brown, J Carter,.....East Greenwich, R I
Brugler, J M.....Hope, N J
Burroughs, H K.....Roxbury, N Y
Campbell, A G.....St. Hilaire, Can
Cochrane, M H.....Compton, Can
Cooper, T S..... Coopersburg, Pa
Craig, J R..... Edmonton, Can

Breed, J H.....Hatfield, Mass
Cameron, C.....Brickerville, Pa
Cochran, T A.....Baltimore, Md
Crozier, William,..... Northport, N Y
Curtis, F D.....Charlton, N Y
Drevar, Dr. A.....Annapolis, Md
Deuel. S T..... Little Rest, N Y
Ely, L D.....Rochester, N Y
Ewing, J H..... ....Villa Nova, Pa
Fellows, B..... Clifton, N Y
Finch. M P.....Otego N Y
Freeman, J W..... ...Troy, N Y
Fulford, A M.....Bel Air, Md
Gibb J L..... Compton, Can
Gorsuch, T T..... Glencoe, Md
Goodell. D H.....Antrim, N H
Graves. A H.....Hatfield, Mass
Groff, A E..... Pikesville, Md
Hale W A..... Sherbrooke, Can
Harlow, R A..... Springfield. Ill
Hayward Bros.....Bridgewater, Mass
Heacock & Son, S.... Kettleby, Ont., Can
Hills, C..... Delaware, O
Hoe, R M..... Mott Haven. N Y
Hoffman, E L.....Mill Creek. West Va
Jackson. Geo..... .....Indianapolis, Ind
John, J F.....Selma, Ala
Johnson, J..... Vincent. Pa
Johnson, R P.....Springfield, Ill
Johnston, B H..... Alexandria. Va
Jones, H B.....Dexter, Mich
Jones, T C..... Delaware, O
Juliand, J.....Bainbridge, N Y
Kay, W F.....Montreal, Can
Kelsey, H C..... Newton. N J
King, W S..... Minneapolis, Minn
Lehman, H F..... Hagerstown, Md
Lewis, D McA..... Lorton Valley, Va
Longenecker, J B..... Union Deposit, Pa
Lovejoy, A J.....Roscoe, Ill
Mattocks, C P.....Portland, Me
McNish, W H.....Lyn, Ont., Can
Mead. H..... Golden's Bridge, N Y
Miller, George,.....Markham, Ont., Can
Miller, W M.....Claremont, Ont., Can
Merriam, H.....Weston, Mass
Morris, Francis,.....Philadelphia, Pa
Morris, J C.....West Chester, Pa
Moseley & Stoddard,.....Poultney, Vt
Norton, W C..... Aldenville, Pa
Onderdonk, A S..... Eagle Harbor, N Y
Otis, S G..... ..... Hallowell. Me
Peck, B F.....East Bethany, N Y
Pickrell, J H.....Harristown, Ill
Pullen, W.....Miamiville, O
Reeve, C.... .....Minneapolis, Minn
Rhodes, T F.....Camillus, N Y
Riddle. F.....Big Bend, Pa
Roach, John,..... Toronto, Can
Robins, J N.....Northport, N Y
Schnebly. M N.....Fairview Md
Sedgwick, H.....Cornwall Hollow, Ct
Sherman, H B..... Burnett. Wis
Snell. John's Sons,.. .....Edmonton, Can
Stone. F W..... Guelph, Can
Stuyvesant. J R..... Poughkeepsie, N Y
Swanwick, R..... Cirencester, England
Talcott, Jona,..... Rome, N Y
Taylor, C S..... Burlington, N J
Terrill. M W.....Middlefield, Ct
Thorne, Edwin, ...Millbrook. N Y
Thornton, J C.....Avonia, Pa
Tilton. W S.....Augusta, Me
Underhill A A.....Poughkeepsie, N Y
Van Waganen, J..... Lawyersville, N Y
Walling. A J..... New-Ohio. N Y
White. B F.....Ashley Falls, Mass
Woods, J R..... Ivy Depot. Va
Zeller, B S..... Hagerstown, Md

Cheshire Swine.

Allen. T.....Pittsfield Mass
Bacheldor, J M..... Pownall, Vt
Cranston, H S..... Oneida Castle, N Y
DeForest, J J.....Duanesburg, N Y
Green, D.....Belleville, N Y

Chester County Swine.

Benson, Burpee & Co.....Philadelphia, Pa
Cloud & Sons, Jas.... Kennett Square, Pa
Cloud, T A.....Kennett Square, Pa
Cochran, T A.....Baltimore. Md
Earll, J H..... Skaneateles. N Y
Edgerton. James,..... Barnesville. O
Ficklin, S W.....Charlottesville. Va
Graves, A H..... Hatfield, Mass
Horton. C C & E W..... Muscatine. Iowa
Morris, F.....Philadelphia, Pa
Roberts, J C.....West Chester. Pa
Sharpless, T.....Street Road. Pa
Todd, S H.....Wakeman, O
Wood & Son, T.....Doe Run, Pa
Worth, F..... Marshallton, Pa
Young & Co., James, Jr. .Marshallton, Pa

Essex Swine.

Bowditch, E F..... Framingham, Mass
Cobb, J..... .... Beloit. Wis
Farlee, G W..... Cresskill, N J
Graves, A H..... Hatfield, Mass
Gutchess. O..... Port Byron, N Y
Harris. Joseph,.....Rochester, N Y
Hooker. H E.... .....Rochester, N Y
Hulse. B..... Allentown, N J
McCready, W R.....Saugatuck, Ct
Riddle. F..... ..... Big Bend, Pa
Sherman, F.....Vienna. Va
Wheeler, M I..... Great Barrington. Mass
White, B F..... Ashley Falls, Mass

Jersey Red Swine.

Dimon, J.....Putnam, Ct
Holmes, W M..... Greenwich, N Y
Pettit. C..... .....Salem, N J

Poland China Swine.

Austin, H W.....Woodstown, N J
Andrews, E S..... Orange, N J
Beekman, A S..... South Branch, N J
Bellis, D..... Ringoes, N J
Benson, Burpee & Co.... Philadelphia, Pa
Camp. J F..... Apalachin, N Y
Catlin, G L.....Owego, N Y
Cowles, C P.....Syracuse. N Y
Ellwood, Dr. L.....Schenectady, N Y
Gray, C K.....East Montpelier, Vt
Holman. S.....Somerville, N J
John. J F..... ..Selma, Ala

Jones, J W.....Chatham Village, N Y
Johnson, G B.....Brewerton, N Y
Lippincott, James,..... Mt. Holly, N J
Magie, D M..... Oxford, O
Maxon, J J.. .....Gallipolis. O
Newell, Dr. A D....New-Brunswick. N J
Paulding, Dr. M J..... Daretown. N J
Pettit, F.....Salem, N J

SUFFOLK SWINE.

Benson, Burpee & Co.... Philadelphia, Pa
Clark, D M.....Elyria, O
Frank & Son, A...Cheltenham, Ont., Can
Harison. T L..... Morley, N Y
Jones, H B. .....Dexter. Mich
Magone, D., Jr.....Ogdensburg, N Y
Matthewson, H M.....Stayner. Ont. Can
Wentworth, John,..... Chicago, Ill

YORKSHIRE SWINE.

Breed. J H.....Hatfield, Mass
Chandler, J K.....Boscawen, N H
Cole, W H.....Clinton, N J
Hoe, R M..... Morrisania, N Y
Lawson, Dr. G..... Halifax, Nova Scotia
Maxon, J J.....Gallipolis, O
Mead, H.. .....Golden's Bridge, N Y
Merriam, H.....Weston, Mass
Snelling, H.....South Lincoln Mass
Stone, F W..... .....Guelph, Can

POULTRY FANCIERS.

Acton, C B..... Salem, N J
Barney, E H.....Milford, N Y
Bates, C.....Richfield Springs, N Y
Beebe, J M..... Cassadaga. N Y
Beekman, A S..... ...South Branch, N J
Beer, T C..... Bucyrus. O
Benson, Burpee & Co. .. Philadelphia, Pa
Birnie, A..... ..... Holyoke, Mass
Bliss. O S..... .....Georgia, Vt
Bond, D.. .....Brownsville. Tenn
Breese. H G.....Hoosick. N Y
Burnham, G P..... .....Melrose. Mass
Campbell. A G.....St Hilaire, Can
Chapin. G W..... Providence, R I
Clark. D M..... Elyria, O
Craft. G N..... Franklin, Pa
Clift, Wm.. ... .Mystic Bridge, Ct
Cooper, T S..... Coopersburg, Pa
Cowles, C P.....Syracuse, N Y
Cox, E C. .. .. Kennett Square. Pa
Crozier. William,..... Northport, N Y
Day, C J.....Dunellen, N J
DeForest, J J..... Duanesburgh, N Y
Dickie, Dr. A M.....Doylestown, Pa
Dunbar, E B..... Bristol, Ct
Earll, J H.. .....Skaneateles, N Y
Edgar, J B.....Rahway, N J
Elben, C B ..... Pittsburgh. Pa
Ely, L D., Jr.....Rochester, N Y
England, T Y..... Berlin, N J
Evans, J.....Schaghticoke, N Y
Fassett, E..... ... Forkston. Pa
Fowler, W W..... West Haven, Conn
Frizzell, A W.....Pikesville, Md
Frost, G M.....Watertown Ct
Gibson, R..... London. Can
Gilman, V C..... Nashua, N H
Goodell D H..... ... Antrim, N H
Gregg, O..... .. Washingtonville, N Y
Haines, R H .. . ... Malden, N Y
Hasbrouck, B & V.... South Orange, N J
Hasbrouck. O., Jr..... Modena. N Y
Hawkins, C F..... ..... Goshen, N Y
Hayt. James A.....Patterson, N Y
Hayward, C E L..... Peterboro, N H
Higgins. J C..... Delaware City, Del
Hills, W R. .... Albany, N Y
Hoffman, E L..... Mill Creek, West Va
Hooff, L..... ..... Alexandria, Va
Holcombe, P Q. ..... Reaville, N J
Holly, J A... .. .. Greenville. N Y
Holmes, Harry,..... Greenwich, N Y
Horne, W... ..... Janesville, Wis
Hough, S D..... ... Weatogue, Ct
Hulse, B..... ..... Allentown, N J
Hults, J B..... Girard. O
Humphrey, A B.....Weavertown. N Y
Hunt, W.....North East. Md
Ives, John S..... Salem, Mass
Jackson, G.....Indianapolis, Ind
Josselyn, G.....Fredonia, N Y
Judd, J W..... Orange, N J
Juliand, Jos..... Bainbridge, N Y
Kellogg, F N.....Sheffield, Mass
Kelsey, H C.... .. ..Newton, N J
Lewis, D McA..... Lorton Valley, Va
Lewis. R.. .....Castleton. N Y
Long, J C., Jr... .....Philadelphia, Pa
Magone, D., Jr.,..... Ogdensburgh, N Y
Maguire, M B.....Westchester, N Y
Merriam, H..... Weston, Mass
Mattocks, C P.....Portland. Me
Maxon, J J.....Gallipolis, O
McKeen, T L.....Easton. Pa
McKinstry, A W..... Chicopee, Mass
Morrell, R.....Manhasset. N Y
Mullin. A F.....Mt. Holly Springs, Pa
Newell, Dr. A D.... New-Brunswick, N J
Osborne, W F.....Ansonia, Ct
Osgoodby, J H..... Pittsford, N Y
Parker, J J..... .... West Chester, Pa
Parker. S J..... West Chester. Pa
Pennell, E .....Chester. Pa
Pennington, J C & D... ...Paterson, N J
Perkins, R W..... Oxford. N Y
Phillips, J H..... Coventry, N Y
Potter, M.....Onondaga Valley, N Y
Reeve, C..... Minneapolis, Minn
Reihl, E A..... Alton. Ill
Rhodes, H A.....East Greenwich, R I
Rice, J L.....Rensselaerville, N Y
Riddle, F..... Big Bend, Pa
Roberts, J A.....Paoli, Pa
Robinson. J A.....Litchfield, Ct
Rutherford, W L & W. Waddington, N Y
Sanderson, J P .....Arlington, Md
Shaffer, J H.....Macungie, Pa
Sharpless C L.....Philadelphia, Pa
Sherman, F.....Vienna Va
Sherman, H B..... Burnett, Wis
Smith, C..... Mystic Bridge, Ct
Stevens, C B & C O.....Vergennes. Vt
Taber, W F.....Poughkeepsie, N Y
Taylor, C S.....Burlington, N J
Terrill, M W..... ... Middlefield, Ct
Thornton, J C..... Avonia. Pa

Thompson, F N.....Southboro, Mass
Underwood, H J & W H.... Homer, N Y
Vanderveer, G. .....Port Jackson N Y
Warner, G H..... New-York Mills. N Y
Webster, C F..... Girard. Pa
Weld. M C ..... Closter, N J
Wells, C H.....East Windsor Hill. Ct
Wentworth. John, ... Chicago. Ill
Wheaton Brothers,..... ...Zoar, Mass
Wood, B L..... Doe Run, Pa
Wotherspoon, I..... Montreal, Can

BEES.

Root, L C..... St. Johnsville, N Y

ANGORA GOATS.

Goe, J S.... ..... Brownsville, Pa

FISH AND SPAWN.

Clift, W..... ...Mystic Bridge, Ct

FERRETS.

Johnson. J..... ..... Hartland, Wis
Osgoodby, J H.... ....Pittsford, N Y

DOGS.

Allan, J S.. ..... Montreal, Can
Abbott, W.. ..... Montreal, Can
Benson. Burpee & Co.....Philadelphia, Pa
Burns, Wm .....Montreal. Can
Campbell. A G...St. Hilaire, Quebec, Can
Crozier. William,..... Northport. N Y
Hulse. Benj.....Allentown. N J
Juliand Joseph, ... Bainbridge, N Y
Kittredge, J. .....Taunton. Mass
Lehman, H F..... Hagerstown, Md
Long. J C... ... . Philadelphia, Pa
Mead. H..... Golden's Bridge. N Y
Morris, F.....Philadelphia, Pa
Mullin, A F.....Mt. Holly Springs. Pa
Robbins. E J..... Wethersfield, Ct
Taylor. W S. ..... Burlington, N J
Watrous. D W..... New-York
White, B F.....Ashley Falls, Mass

DEER.

Mattocks, C P. .....Portland, Me

HORTICULTURAL AND SEED REGISTER.

NURSERIES.

Adair, William,..... Detroit, Mich
Adams, J W..... Springfield. Mass
Allen, Edwin,.....New-Brunswick, N J
Achelis. G.. ... . West Chester, Pa
Baird D ..... Manalapan, N J
Balderston, George,..... ....Colora Md
Battles. A. ... . Girard. Pa
Benton, D C.. ....Quincy, Ill
Biddle. F C..... ... Chaddsford. Pa
Buist. R .....Darby Road, Philadelphia
Burrow. Wood & Co..... Fishkill, N Y
Chase & Co., R G..... Geneva, N Y
Dann, C H ... . Warsaw, N Y
Davis & Co., F.....Richmond Va
Douglas & Sons,... .....Waukegan Ill
Draper, James, ...Worcester, Mass
Edgerton, J ....Barnesville, O
Edwards. S., Jr.,..... LaMoille. Ill
Ellwanger & Barry,..... ..Rochester. N Y
Ferris, W L., Jr. & Co., Poughkeepsie, N Y
Frost & Co..... ... Rochester, N Y
Foster. Suel,..... .....Muscatine, Iowa
Grieves, J.. .....Patterson, N J
Hammond, A. ..... Geneva, N Y
Hance & Son, A.... .....Red Bank, N J
Hanford. R G .... Columbus, O
Harrington, E W..... Palmyra, N Y
Heikes. W F.. ....Dayton. O
Hooker & Bro., H E .....Rochester. N Y
Hoopes Bro. & Thomas, West Chester. Pa
Hovey & Co... ..... Boston, Mass
Hoyt & Sons, S..... ..New-Caanan. Ct
Johnson, W W.....Central Lake. Mich
Jones, H T .....Rochester, N Y
Jones & Palmer,.....Rochester. N Y
King & Murray..... .Flushing, N Y
Little, W S.... ....Rochester, N Y
Maxwell & Bros., T C..... Geneva, N Y
McKelvie. W G.....Geneva, N Y
Meehan. Thomas,..... Germantown. Pa
Moody & Sons, E..... Lockport. N Y
Moon, W H..... Morrisville, Pa
Ohmer, N.....Dayton, O
Parry, William, ... Cinnaminson, N J
Parsons & Co., R B .... ..Flushing. N Y
Parsons & Co., S B.....Flushing N Y
Pearson, W L..... ...Schenectady. N Y
Peirson. E C.....Waterloo, N Y
Peters, C P .....Concordville. Pa
Peters, Randolph,.....Wilmington, Del
Phœnix, F K .... Bloomington. Ill
Pottle, W L.....Naples. N Y
Pullen, T J.....Hightstown. N J
Purdy & Johnston..... Rochester. N Y
Rakestraw & Pyle, ...Willowdale, Pa
Richardson & Kelsey,.....Geneva, N Y
Richardson & Nicholas,..... Geneva, N Y
Kiehl. E A. .... Alton, Ill
Roberts. Josiah A..... .. Malvern. Pa
Root, James A.....Skaneateles. N Y
Saul, John.. .....Washington, D C
Simpson, J H. ....Vincennes, Ind
Smith. W & T.....Geneva. N Y
Smith & Powell,.....Syracuse, N Y
Storrs. Harrison & Co..... Painesville. O
Strong & Co.. W C.....Brighton, Mass
Sylvester E Ware,..... Lyons, N Y
Tassell, G W.....Marion, O
Teas, E Y. ... . Dunreith, Ind
Thompson, G W..... .. Stelton, N J
Watson. B M..... Plymouth, Mass
Weltz, L.....Wilmington. O
Will. W F.. ..... Fayetteville, N Y
Yeomans, T G.....Walworth, N Y

SMALL FRUITS AND GRAPES.

Allen. E E.....Northampton, Mass
Allen. S L..... . ....Cinnaminson. N J
Allis. S J..... ... .. Erie. Pa
Babcock, I H.....Lockport, N Y
Bateham, M B.....Painesville, O
Batterson, N D.....Buffalo, N Y
Bennett. W.....Hamilton. O
Biddle, F C..... Chadd's Ford. Pa
Breese, H G..... Hoosick, N Y

Briggs, I W..... West Macedon, N Y
Brown & Sons, D H., New-Brunswick, N J
Burgess, Edward,..... Poughkeepsie, N Y
Burgess Thomas H.. .....Highland, N Y
Campbell, G W.. .. .. Delaware. O
Clark, B W..... ..... Lockport, N Y
Community Farm,..... Oneida. N Y
Collins. John S.....Moorestown. N J
DeCou, S C..... .....Moorestown, N J
Dingwall. John,. .... Albany, N Y
Draper, James, ...Worcester, Mass
Durand, E W..... ..... Newark, N J
Ellwanger & Barry,..... Rochester, N Y
Ferris, W L., Jr. & Co.,Poughkeepsie. N Y
Griffith, Wm.....Northeast. Pa
Haines, R H..... Malden, N Y
Hale Bros.....South Glastonbury, Ct
Hanford, R G..... .. Columbus, O
Hanford & Co.....Bristol. Ind
Hendricks, H..... Kingston, N Y
Hexamer, F M.....New-Castle, N Y
Hoag & Clark,..... Lockport, N Y
Hubbard, T S..... ..... Fredonia. N Y
Hunt, W M.....Waterloo, N Y
Leech, M W.....Fayetteville, N Y
Low. E E.....East New-Market, Md
Miller. Amos,..... Carlisle, Pa
Miner, T B.. ..... Linden, N J
Moon, W H..... ...Morrisville, Pa
Parry, William,.. ..... Cinnaminson, N J
Parsons & Co., R B.... .. Flushing. N Y
Patterson, J S..... .... Berlin Heights. O
Perry & Robinson,.....Syracuse, N Y
Pierson. F R.....Tarrytown, N Y
Potter & Co., E J.....Knowlesville, N Y
Purdy & Hance,.....South Bend, Ind
Quinn. P T. .... Newark. N J
Reihl, E A..... Alton. Ill
Ringueberg & Son, N S ....Lockport, N Y
Robinson, E D..... Howlett Hill, N Y
Roe, E P...Cornwall-on-the-Hudson. N Y
Schroeder. Dr. H..... Bloomington, Ill
Smith, H H..... West Haven. Ct
Stokes, E..... Berlin, N J
Strong, W C..... . ....Brighton, Mass
Sylvester. E W.....Lyons, N Y
Thompson, G W.... New-Brunswick, N J
Tillson, O J.....Highland. N Y
Trowbridge, F... ..... Milford, Ct
Underhill, E B.....Poughkeepsie, N Y
Underhill. S W..... Croton Landing N Y
Wildey, D C..... ...Hudson. N Y
Williams, E & J C .....Montclair. N J
Wood, L L .....Vineland, N J
Worden, S..... Minetto, N Y

Seedsmen, Florists, &c.

Allen & Co., R H..... New-York
Balderston, George..... Colora, Md
Barrett & Co., W E . ... Providence. R I
Beach S. ..... Branford, Ct
Benson, Burpee & Co ... Philadelphia. Pa
Bliss & Sons, B K.... ..... New-York
Bown, R R.....Brantford. Ont., Can
Brainard, D C.....Mt Lebanon, N Y
Briggs & Bro.....Rochester. N Y
Brill, Francis,..... .....Mattituck. N Y
Brown & Sons, D H..New-Brunswick, N J
Brown, W F... ....Oxford, O
Buist, R....Darby Road, Philadelphia, Pa
Buist, R., Jr..... ....Philadelphia, Pa
Carson, W H.....New-York
Clement, W..... Adrian, Mch
Crosman Bros..... Rochester. N Y
Detroit Seed Co..... ....Detroit. Mich
Dingee & Conard,..... West Grove, Pa
Dreer. Henry A.. .....Philadelphia, Pa
Ferry, D M & Co..... Detroit. Mich
Fleming, James,..... New-York
Goodsell, L W ..... Amherst, Mass
Grieves. I .....Paterson. N J
Gregory. J J H..... Marblehead. Mass
Hance & Son, A.....Red Bank, N J
Hawkins & Cornish,..... Goshen, N Y
Hawley, R D..... Hartford, Ct
Henderson & Co., Peter,.....New-York
Hendrick, J ..... Albany, N Y
Hexamer, F M.....New-Castle, N Y
Hovey & Co.....Boston, Mass
Ives. John S..... .. .. Salem, Mass
Kern. Steber & Co.....St. Louis, Mo
Landreth & Son, David, Philadelphia, Pa
Lewis, R..... Castleton. N Y
Moon, O.....Morrisville, Pa
Moon & Son, Mahlon,.... Morrisville, Pa
Nelson & Co., D G.....Fort Wayne, Ind
Nordyke, C A ..... Richmond, Ind
Parsons & Co., R B .....Flushing, N Y
Petit, C..... Salem, N J
Plant Seed Co..... .... .. St. Louis, Mo
Price & Knickerbocker,.....Albany, N Y
Quinn, P T..... .....Newark, N J
Reeves, E A.. .... New-York
Rennie, W..... .....Toronto. Ont., Can
Rice, J B .....Cambridge. N Y
Root. J A..... ..... Skaneateles. N Y
Sanders, Carew, ...Colman, Mo
Sanders, Edgar,.. .... Chicago, Ill
Schlegel. Everett & Co..... Boston, Mass
Smith, Edw.,..... .. ...Coila, N Y
Snook. L D..... .....Barrington, N Y
Spooner, W H..... ..... Boston, Mass
Such, G.....South Amboy, N J
Teas, E Y.... .... Dunreith, Ind
Thorburn & Co., J M.....New-York
Tillinghast Brothers,..... La Plume, Pa
Vick, James,.... ..... Rochester, N Y
Washburn & Co. ..... Boston, Mass
Watson, B M... ..... Plymouth, Mass
Wells, S M & D..... .. Wethersfield, Ct
Woolson & Co.....Passaic, N J

Cranberries.

Trowbridge, F..... ...New-Haven, Ct

Seed Grains, &c.

Andre. J H.....Bingham's, N Y
Arnold, Charles,..... Paris, Can
Beattie, H C .. .. Bellona, N Y
Biddle, F C.. ..... Chaddsford, Pa
Beekman, A S..... South Branch, N J
Blunt. A E..... Cleveland, Tenn
Camp, J F..... Apalachin. N Y
Casey, F. .....Harrisonville, O
Chase, E T.....Deerfield Centre, N H
Crofut & Co., E B.....Syracuse, N Y
Crozier, W..... Northport, N Y

Cowles, C P.... .. ..Syracuse, N Y
Doak, M S..... .....Home, Tenn
Eastman, W L..... Ovid, N Y
Evans, R.....Hamilton, Ont., Can
Fanning, S B..... Jamesport. N Y
Heiges, J M ....York, Pa
Hendricks, H.....Kingston, N Y
Henry, E.....Greenville, Tenn
Hoffman, E L..... Mill Creek, West Va
Hotsenpiller, E.....Springfield, O
Hough & Co.....Knoxville, Tenn
Jerome, J H.....Saganaw City, Mich
Jones & Co., H T.....Nashville, Tenn
Long & Co., N..... ..Russellville, Ky
Miller, J. ..... Penn Yan, N Y
Packard, B G.....Medina, N Y
Perrine, W D.....Lyons, N Y
Perry, W N..... ....Rushville, N Y
Perry & Robinson,.....Syracuse, N Y
Phelps, C C ... . Vernon, N Y
Roberts, D G..... Pittsfield, Mass
Scott, W..... .Geneva, N Y
Stacy, W W..... Geneva, N Y
Swan, R J .....Geneva, N Y
Walker & Mairs,.....Schenectady, N Y
Whiting, C L..... Granville, O
Wilson, S.....Mechanicsville, Pa
Wood, B L.....Doe Run, Pa

SEED POTATOES.

Armitage, J H..... Tyre, N Y
Bliss & Sons, B K..... New-York
Brownell, E S. ..... Essex Junction, Vt
Campbell, G W..... Delaware, O
Cowles, C P..... Syracuse, N Y
Gregory, J J H ..... Marblehead, Mass
Green, W C.....Schenectady, N Y
Hexamer, F M..... New-Castle. N Y
Holliday, S V.....North Springfield, Pa
Hulst, P D .....East Penfield. N Y
Orbison, W A.....Huntingdon, Pa
Peters, C P..... ... .Concordville, Pa
Riehl, E A.....Alton. Ill
Roberts, D G. ..... Pittsfield, Mass
Scott, W.....Geneva, N Y
Stilson, G..... Franklin, N Y
Talcott & Sons, J..... ...Rome. N Y
Tillinghast Bros.,. .....Factoryville, Pa

SWEET POTATOES.

Brown & Sons, D H., New-Brunswick. N J
Oak Pond Farm..... Willimantic. Conn
Rathbone, W W.. .....Marietta, O

IMPLEMENTS, MACHINES, FERTILIZERS, &C.

AGRICULTURAL WAREHOUSES.

Allen & Co., R H. ...Box 376, New-York
Allen & Co., S L..... ...Philadelphia, Pa
Ames Plow Co.....Boston and New York
Bradley Manufacturing Co., Syracuse, N Y
Collins Company,..... New-York
Cornell, O H P.....Albany, N Y
Everett & Small,.....Boston, Mass
Griffing, H B... ....New-York
Higganum Manufact'g Co.,..Higganum. Ct
Ithaca Agricultural Works,....Ithaca, N Y
Lummus & Co., E E.....Boston, Mass
Nash & Brother,... .....New-York
New-York Plow Co..... New-York
Price & Knickerbocker,.. ...Albany, N Y

HORSE-POWERS, THRESHERS AND OTHER MACHINES.

Blymyer Company,..... Cincinnati, O
Ellis Keystone Ag'l Works. Pottstown, Pa
Gray & Sons, A W.....Middletown, Vt
Heebner & Sons,..... Lansdale, Pa
Harder, M..... ..... Cobleskill, N Y
Westinghouse & Co., G., Schenectady, N Y
Wheeler and Melick Co ... Albany, N Y

MOWERS AND REAPERS.

Adriance, Platt & Co..... ...New-York
Allen & Co., R H..... ..New-York
Bradley Manufacturing Co..Syracuse, N Y
Eagle Mower & Reaper Co...Albany, N Y
Warrior Mower Co..... Little Falls, N Y
Wood, W A ... .Hoosic Falls, N Y

LAWN MOWERS.

Chadborn & Coldwell Manufacturing Co Newburgh, N Y
Graham, Emlen & Passmore, Philadel'a, Pa

STEAM ENGINES FOR FARMS.

Griffith & Wedge,... ..... Zanesville, O
Skinner & Wood,..... .Erie, Pp
Taylor Manufact'g Co., Westminster, Me
Whitman & Burrill,.....Little Falls, N Y
Wood, Taber & Morse,..... Eaton, N Y

DAIRY APPARATUS, &c.

Barker, J W., *Dairy Salt*,..Syracuse, N Y
Blanchard's Sons, P., *Churn*, Concord. N H
Bunnell & Brown,.. .....Guilford, N Y
Hardin. L S ....Louisville, Ky
Jones. Faulkner & Co,..... Utica, N Y
Moseley & Stoddard,.....Poultney, Vt
Orange Co. Milk Pan Co.,..Franklin, N Y
Reid A H., *Butter Worker*, Philadelphia, Pa
Vt. Farm Machine Co....Bellows Falls, Vt
Weeks, G B..... Syracuse, N Y
Wells, Richardson & Co., *Color for Butter*, Burlington, Vt
Whitman & Burrill,.....Little Falls, N Y

BUTTER PACKAGES.

Hubbell & Chesebro,.... ...Geddes, N Y
Koehler, J G. ..... Philadelphia, Pa
Russell, D N.....New-York

PUMPS AND GARDEN ENGINES.

Nason Manufacturing Co. ....New-York
Whitman. J A.....Providence, R I

AGRICULTURAL STEAMERS.

Barrows Savery Co. .....Philadelphia, Pa
Burns. C S..... Cincinnati, O
McKenzie, W V... ... .. Jersey City, N J
Prindle, D R..... .East Bethany, N Y

TILE AND TILE MACHINES.

Bender, W M.....Albany, N Y
Jackson, George,.....Albany, N Y

OTHER SPECIALTIES.

Allen, C G., *Horse Rake*,.... Barre, Mass
American Hay Machine Co.,*Hay Loader*, Troy, N Y
Barker & Son, *Road Wagons*, New-York
Bartholomew, C., *Ditcher*, .. Etna, N Y
Bliss & Sons, B. K., *Hand Seed Sower*. New-York
Boyer, W L., *Farm Mill*, Philadelphia, Pa.
Brown & Sharp M'f'g Co., *Horse Clippers*, Providence, R I
Butterworth, R., *Cider Mill*, Trenton, N J
Clark, Geo. R., *Fence*, Livonia Station, N Y
Corcoran, A J., *U. S Windmill*, New-York
Crofut & Co., E B.. *Iron Harrows, &c.*, Syracuse, N Y
Dederick & Co., *Hay Press*, Albany, N Y
Eclipse Windmill Co , *Windmills*, Beloit, Wis
Everett & Small, *Swivel Plows*, Boston, Mass
Fairbanks & Co.. *Scales* .... Albany, N Y
Fitch & Co., H W., *Hay Conveyor*, Lithgow, N Y
Gallup, S N.. *Grain Drill*. Macedon, N Y
Gawthrop & Son, A., *Hydraulic Rams*, Wilmington, Del
Gifford, Johnson & Co., *Cultivator*, Hudson, N Y
Goodell, D. H., *Sower*, ... Antrim, N H
Hickok, W. O., *Cider Mill*, Harrisburg, Pa
Holbrook Plow Co., *Plows*... Boston, Mass
Kenyon Bros., *Potato Digger*, Carbondale, P a
Livingston & Co., *Corn Sheller*, Pittsburgh, Pa
Malleson, C H., *Corn Husker*, Hudson, N Y
Mayne, J., *Horse-Hoe*... Gilbertsville, N Y
Miller, L J., *Farm Mills*,. . Cincinnati, O
Mohawk & Hudson Co., *Hay Press*. Waterford, N Y
Nash & Bro., *True's Potato Planter*, New-York
Nellis & Co., A J., *Harpoon Fork*. Pittsburgh. Pa
Newton, C O., *Spring Wagons*, Homer. N Y
Noyes, A., *Hand Weeder*, .. Bangor, Me
Oneonta Manufacturing Co., *Hodge Plow*, Oneonta, N Y
Pennock Manuf'g Co., *Hay Fork*, Kennett Square, Pa
Perry, F L., *Scarifier*. Canandaigua N Y
Pope & Baldwin, *Corn Planter*, Quincy. Ill
Rue, G W.. *Hand Cultivator*, Hamilton, O
Smoothing Harrow Works,...Geneva, N Y
Wagan, R M., *Green Corn Cutter*, Mt. Lebanon, N Y
Warrior Mower Co., *Randall Harrow*, Little Falls. N Y
Weeks & Co., G B., *Hay Fork*. Syracuse, N Y

FERTILIZERS.

Allen & Co., R H..... .... New-York
Baker & Co., H J..... New-York
Bowker, W H & Co.....Boston, Mass
Cayuga Plaster Co.,... Union Springs, N Y
Crocker, L L ....Buffalo, N Y
Excelsior Fertilizer Works,..... Salem, O
Farmers' Union,...L. I. City, Long Island
Griffing, H B... .... New-York
Henderson & Co., P..... .... New-York
Hobson, Hurtado & Co .. ...New-York
Mapes, C V..... New-York
Pacific Guano Co.,..... Boston, Mass
Quinnipiac Co..... .... Wallingford, Ct
Ralston & Kirke .... New-York
Rasin & Co., R W L..... Baltimore, Md
Rhodes & Co., B M..... Baltimore, Md
Waring & Bro., T.. ..... Colora, Md
Wing & Evans,..... New-York
Wilcox, A. F., *Plaster*,..Fayetteville, N Y

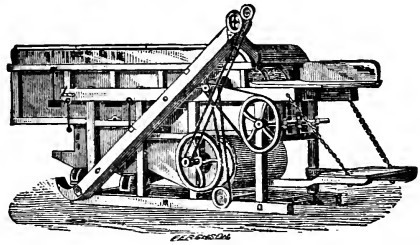
MISCELLANEOUS.

Alden Co., *Fruit Dryer*, 123 Chambers-St., New-York
Averill Chemical Paint Co., Cleveland and New-York
Collins & Co., *Berry Box*, Moorestown, N J
Corbett. A.. *Incubator*,..... New-York
Dana, C. H., *Sheep Labels*, West Lebanon. N H
Fisher & Norris, *Anvils*,....Trenton, N J
Florence Sewing Machine Co., *Kerosene Stoves*, Florence, Mass
Gifford, W C., *Stanchions*, Jamestown, N Y
Giles, W W., *Well Auger*,..St. Louis. Mo
Griffing, H B., *Earth Closets*,.. New-York
Gurley, W & L E., *Draining Levels*, Troy, N Y
Habirshaw, W. H., *Chemist*,... New-York
Haines, R H., *Berry Basket*, Malden, N Y
Hapgood & Co., C. E., *Wool*, Boston, Mass
Horne, W., *Teat Opener*,. Janesville, Wis
Hume, R.. *Food for Cattle*. Richmond. Va
Hygroscope M'f'g Co., *Weather Indicators*, Albany, N Y
Kendall, E., *Barometers*, Lebanon Springs, N Y
Kidder & Laird, *Carbolic Preparations*, New-York
Lesley, A M., *Furnaces*, &c... New-York
Lewis & Co., D W., *Dairy Products*. New-York
Mayne, J., *Water Wheel*, Butternuts, N Y
Masury & Son, J W., *Paints*... New-York
Merchant & Co., S L., *Portland Cement*, 76 South-St., New-York
Post, C C. *Sap Buckets, &c*, Burlington, Vt
Ridgway & Russ. *Plumbers*, Albany, N Y
Rumsey & Co., *Cider Press Screws*, Seneca Falls. N Y
Stites & Co., *Iron Measures*, Cincinnati. O
Trowbridge, F.. *Grafting Wax*, Milford, Ct
Trump Bros., *Scroll Saws*. Wilmington, Del
Tucker, Dr. W. G., *Chemist*, Albany, N Y
Wasson & Martin, *Roofing*, Albany. N Y
West Grove Manuf'g Co., *Peck's Atomizer*, West Grove, Pa
Wheeler, C L., *Foot Pad*,...Boston, Mass

ALBANY AGRICULTURAL WORKS.

O. H. P. CORNELL, Proprietor,

ALBANY, N. Y.



CORNELL'S A. B. C. THRESHER AND CLEANER.

This Thresher and Cleaner combines the best points which have survived the nearly endless inventions and attempted improvements in these machines for the last twenty-five years. It is built of the best materials, in the best manner, and upon sound mechanical principles; furnished with cast steel shafts and Babbitted bearings. The Fan Shaft is entirely separate from the shaker or cleaner shoes, and if desired, may be driven at different speeds to suit the kind and character of the work. The Shaker and Cleaner Shoes travel in opposite directions, each reaching the end of its stroke at the same instant of time, thus serving to neutralize each other's jar or vibration. A dust flue carries away the dust from the feeder.

Full directions for setting up the machine and threshing the several kinds of grain go with every machine.

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Weight.—26-inch cylinder machine, 1,050 pounds; 30-inch cylinder machine, 1,150 pounds; 36-inch cylinder machine, 1,250 pounds.

PRICES.

One-Horse Thresher and Cleaner,			12x22	inch cylinder,	$150
Thresher and Cleaner,			14x26	do.	210
do.	do.	same as above,	14x30	do.	220
do.	do.	do.	14x34	do.	250
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16 ft. Straw Carrier, extra					45
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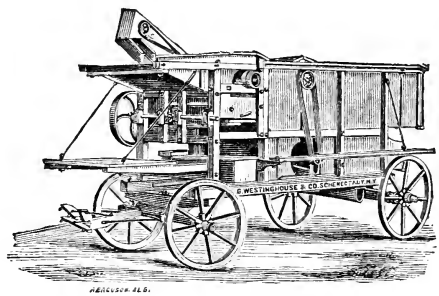

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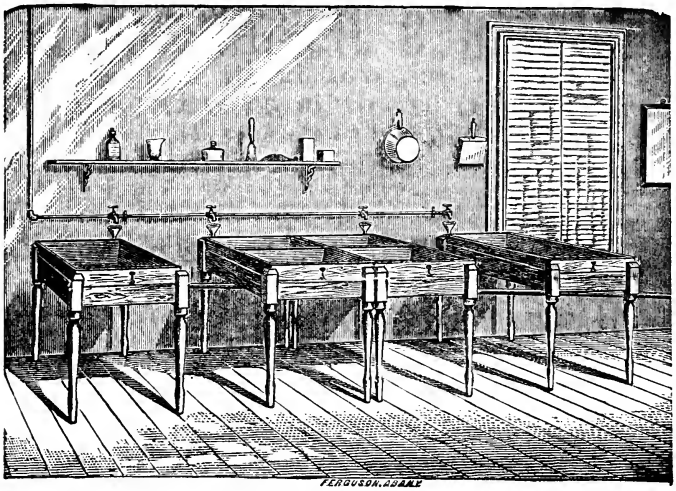

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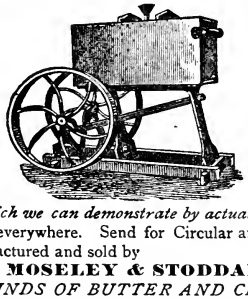

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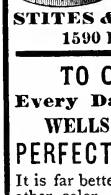

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DR. C. MCLANE'S LIVER PILLS are not held forth or recommended (like most of the popular medicines of the day), as universal cure-alls, but simply for LIVER COMPLAINTS, and those symptoms connected with a deranged state of that organ.

DISEASES OF THE LIVER.

The Liver is much more frequently the seat of disease than is generally supposed. The function it is designed to perform, and on the *regular execution* of which depends not only the general health of the body, but the powers of the *stomach, bowels, brain*, and the whole nervous system, shows its vast and vital importance to human health. When the Liver is seriously diseased, it in fact not only *deranges the vital functions of the body*, but exercises a powerful influence over the mind and its operations, which cannot easily be described. It has so close a connection with other diseases, and manifests itself by so great a variety of symptoms of a most doubtful character, that it misleads more physicians, even of great eminence, than any other vital organ. The intimate connection which exists between the liver and the brain, and the great dominion which I am persuaded it exercises over the *passions* of mankind, convince me that many unfortunate beings have committed acts of deep and criminal atrocity, or become what fools term hypochondriacs, from the simple fact of a *diseased state of the liver*. I have long been convinced that more than one-half of the complaints which occur in this country, are to be considered as having their seat in a *diseased state of the liver*. I will enumerate some of them: *Indigestion, Stoppage of the Menses, Deranged State of the Bowels, Irritable and Vindictive Feelings and Passions*, from trifling and inadequate causes, of which we afterward feel ashamed; last, though not least, more than *three-fourths* of the diseases enumerated under the head of Consumption have their seat in a diseased liver. This truly is a frightful catalogue.

Symptoms of a Diseased Liver.—Pain in the right side, under the edge of the ribs, increasing on pressure; sometimes the pain is in the left side; the patient is rarely able to lie on the left side; sometimes the pain is felt under the shoulder blade, and it frequently extends to the top of the shoulder, and is sometimes mistaken for Rheumatism in the arm. The stomach is affected with loss of appetite and sickness; the bowels in general are costive, sometimes alternating with laxity; the head is troubled with pain, accompanied with a dull, heavy sensation in the back part. There is generally a considerable loss of memory, accompanied with a painful sensation of having left undone something which ought to have been done. A slight dry cough is sometimes an attendant. The patient complains of weariness and debility; he is easily startled; his feet are cold or burning, and he complains of a prickly sensation of the skin; his spirits are low, and although he is satisfied that exercise would be beneficial to him, yet he can scarcely summon up fortitude enough to try it. In fact, he distrusts every remedy. Several of the above symptoms attend the disease, but cases have occurred where few of them existed; yet examination of the body, after death, has shown the Liver to have been extensively deranged.

Ague and Fever.—DR. C. MCLANE'S LIVER PILLS, in cases of AGUE AND FEVER, when taken with quinine, are productive of the most happy results. No better cathartic can be used preparatory to or after taking quinine. We would advise all who are afflicted with this disease to give them a FAIR TRIAL.

Directions.—Take two or three pills going to bed, every second or third night. If they do not purge two or three times by next morning, take one or two more; but a slight breakfast should invariably follow their use. The Liver Pills may be used where purging simply is necessary. As an anti-bilious purgative, they are inferior to none, and in doses of two or three, they give astonishing relief in Sick Headache; also in slight derangements of the Stomach.

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The great popularity of DR. C. MCLANE'S GENUINE PREPARATION has induced unprincipled persons to attempt palming upon the public counterfeit and inferior articles, in consequence of which the proprietors have been forced to adopt every possible guard against fraud. Purchasers will please pay attention to the following marks of genuineness: 1st. The external wrapper is a fine steel engraving, with the signature of C. MCLANE and FLEMING BROS. 2d. The directions are printed on fine paper, with a water-mark as follows: "DR. C. MCLANE'S CELEBRATED VERMIFUGE AND LIVER PILLS, FLEMING BROTHERS, PROPRIETORS." This water-mark can be seen by holding the paper to the light. The Liver Pills have the name stamped on the middle of the box in red wax.

Prepared only by FLEMING BROS., Pittsburgh, Penn.

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DR. C. McLANE'S

AMERICAN WORM SPECIFIC

OR

VERMIFUGE.

No diseases to which the human body is liable, are better entitled to the attention of the philanthropist than those consequent on the irritation produced by WORMS in the stomach and bowels. When the sufferer is an adult, the cause is very frequently overlooked, and, consequently, the proper remedy is not applied. But when the patient is an infant, if the disease is not entirely neglected, it is too frequently ascribed, in whole or in part, to some other cause. It ought here to be particularly remarked, that although but few worms may exist in a child, and however quiescent they may have been previously, no sooner is the constitution invaded by any of the *numerous train of diseases* to which infancy is exposed, than it is fearfully augmented by their irritation. Hence it too frequently happens that a disease otherwise easily managed by proper remedies, when aggravated by that cause, bids defiance to treatment, judicious in other respects, but which entirely fails in consequence of worms being overlooked. And even in cases of greater violence, if a potent and prompt remedy be possessed, so that they could be expelled without loss of time, which is so precious in such cases, the disease might be attacked, by proper remedies, even handed and with success.

SYMPTOMS WHICH CANNOT BE MISTAKEN.

The countenance is pale and leaden colored, with occasional flushes, or a circumscribed spot on one or both cheeks; the eyes become dull; the pupils dilated; an azure semi-circle runs along the lower eye-lid; the nose is irritated, swells, and sometimes bleeds; swelling of the upper lip; occasional headache, with humming or throbbing of the ears; an unusual secretion of saliva; slimy or furred tongue; breath very foul, particularly in the morning; appetite variable, sometimes voracious, with a gnawing sensation of the stomach; at others entirely gone; fleeting pains in the stomach; occasional nausea and vomiting; violent pains throughout the abdomen; bowels irregular, at times costive; stools slimy, not unfrequently tinged with blood; belly swollen and hard; urine turbid; respiration occasionally difficult, and accompanied by hiccough; cough sometimes dry and convulsive; uneasy and disturbed sleep; with grinding of the teeth; temper variable, but generally irritable, etc. Whenever the above symptoms are found to exist, DR. C. McLANE'S VERMIFUGE

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We pledge ourselves to the public that Dr. C. McLANE'S VERMIFUGE DOES NOT CONTAIN MERCURY IN ANY FORM; and that it is an innocent preparation, and not capable of doing the slightest injury to the most tender infant.

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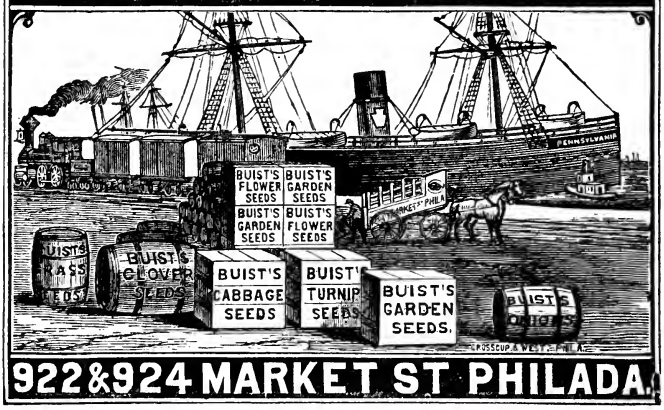

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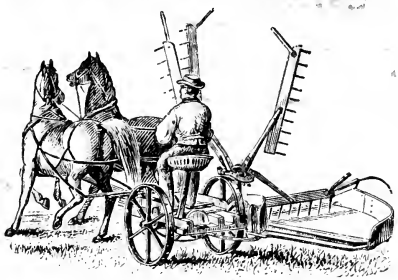

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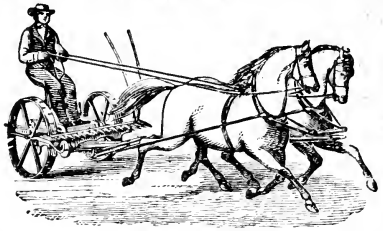

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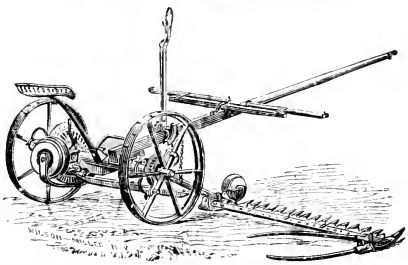

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